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Vultrol gives you good protection against scorching in compounding natural and GRS rubbers. It is an efficient retarder at processing temperatures, a mild activator at curing temperatures.

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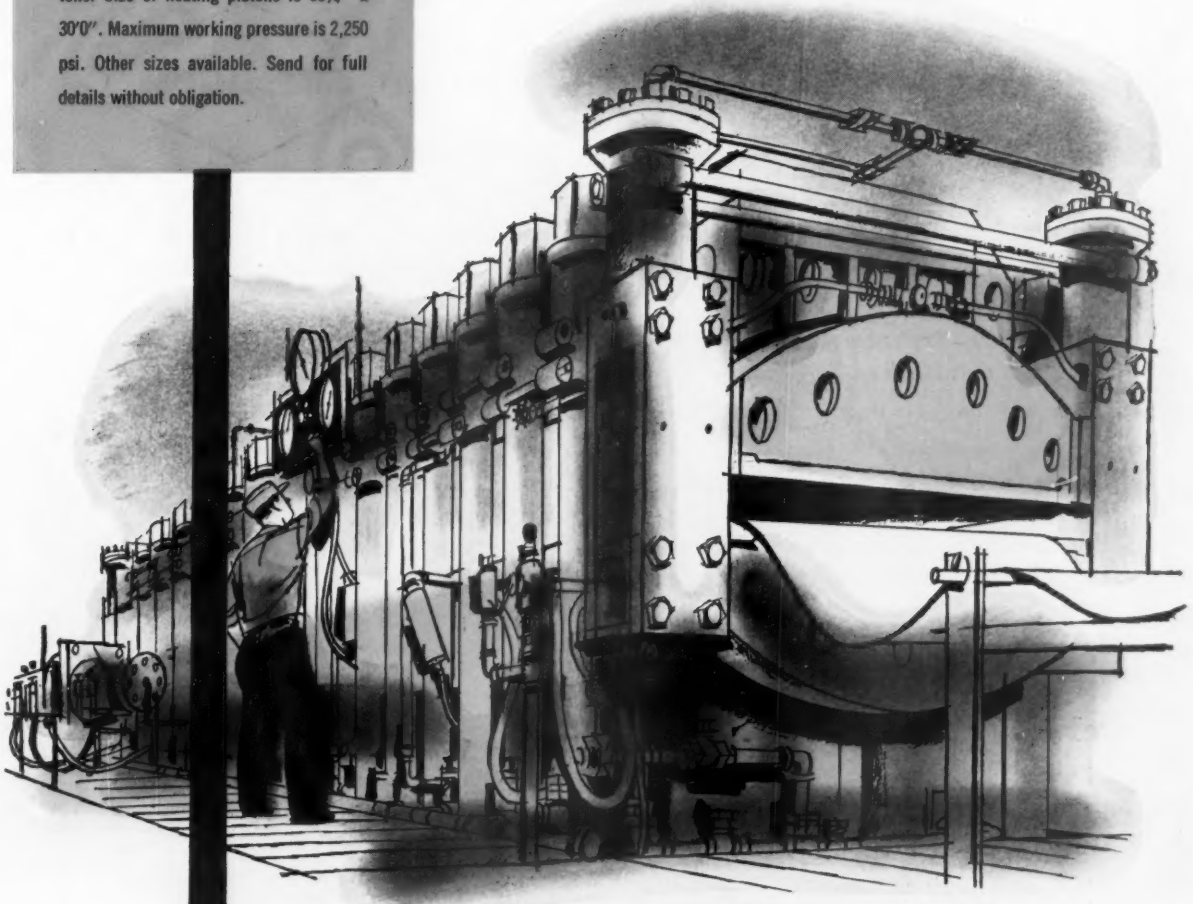

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CHEMIGUM COATING
on the Nylon fabric of this lightweight raincoat makes it "100% waterproof" and guaranteed not to stick, harden or crack.

Photo courtesy Rainfair, Inc., Racine, Wisconsin.

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Microfilm copies of complete volumes of RUBBER AGE are available from: University Microfilms, 313 North First St., Ann Arbor, Mich.

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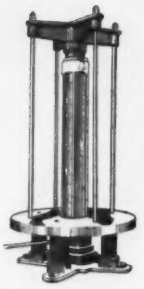
in the good old days



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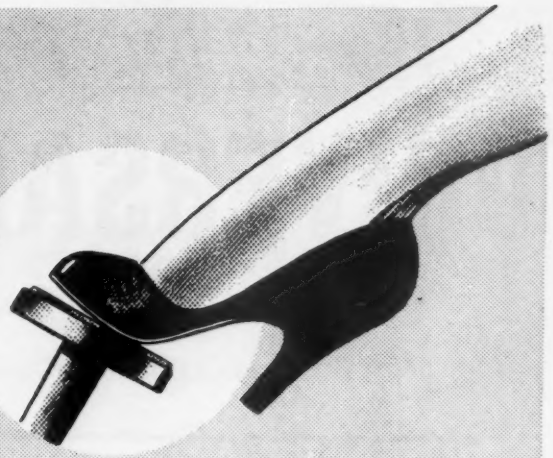

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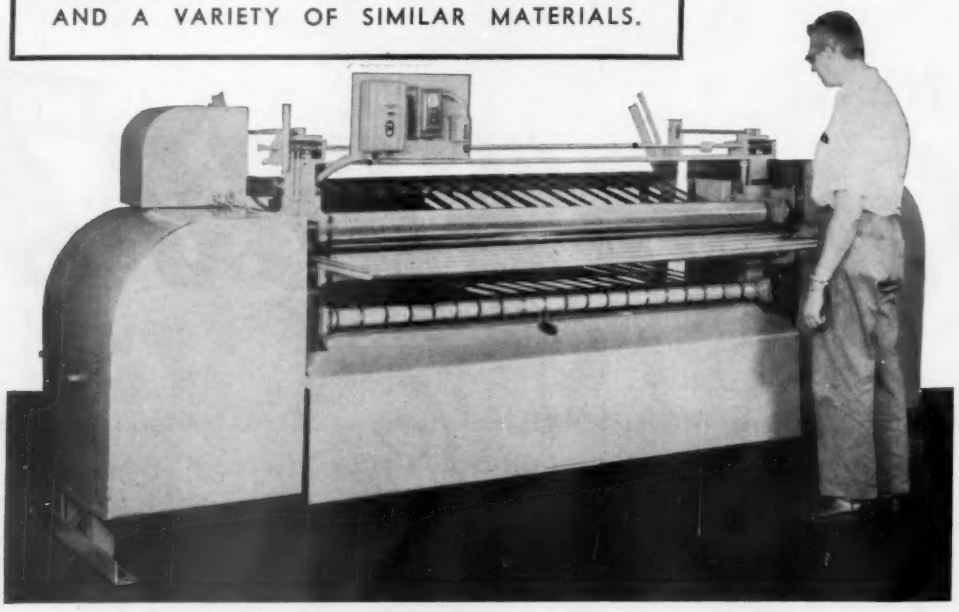

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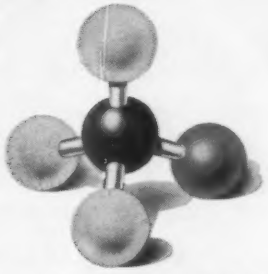

Check these Physical Properties of Solvay Methyl Chloride

Formula	CH_3Cl
Molecular Weight	50.49
Boiling Point	−23.7°C. • −10.65°F.
Freezing Point	−97.6°C. • −143.7°F.
Specific Gravity liquid 20/4°C.	0.918
gas 0°C. 760 mm. (air = 1)	1.74
Pounds per Gallon Liquid at 20°C. (4.83 atm.)	7.5
Coefficient of Cubical Expansion (Liquid) Avg. 0° to 40°C.	0.0022/°C.
Vapor Density at B.P. (760 mm.)	2.47 g./liter
Refractive Index Liquid $N_D^{23.7}$	1.3712
Viscosity Liquid (20°C.)	0.24 centipoise
Surface Tension (in air) 20°C.	16.2 dynes/cm.
Specific Heat Liquid (20°C.)	0.382 cal./g./°C.
Gas (25°C. 15 psia)	
Cp	0.199 cal./g./°C.
Cv	0.155 cal./g./°C.
Latent Heat of Vaporization (At B.P.)	102.3 cal./gm.
Critical Temperature	143.1°C. • 289.6°F.
Critical Pressure	65.9 atm.
Flash Point	Below 0°C.

Solvay Methyl Chloride meets the traditional Solvay high standards of quality and purity. This means that you can depend on it whether you use it as a catalyst carrier in low-temperature polymerizations, a refrigerant, a coolant, a solvent, an extractant for highly heat-sensitive products, a propellant in high pressure aerosols, or as a methylating agent in the production of plastics, intermediates or dyes.

If you have any questions regarding the use of Solvay Methyl Chloride in your operations—write us and we will be glad to send you additional data. For FREE 26-PAGE BOOK on Solvay Chloromethanes, or information on a specific problem, fill out and mail the coupon below.

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EB-7

Merck Opens Pioneer Rubber Laboratory

The Marine Magnesium Division of Merck & Co., Inc. is happy to announce the completion of new research facilities at South San Francisco in recognition of the ever-growing importance of magnesium compounds in rubber technology.

The new facilities include completely equipped rubber and chemical laboratories for developing and pilot testing of new and improved magnesium compounds. It is our belief that these new research laboratories will enable Marine Magnesium to serve better our many loyal customers in the rubber industry. We invite you to bring us your technical problems relating to the use of magnesium products.

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MAGNESIUM PRODUCTS

NOTE:
This advertisement originally appeared in leading newspapers on March 25, 1955. In effect, it is a statement of intent concerning the manufacture of PLIOFLEX — Goodyear Synthetic Rubber — and the PLIOLITE Latices. It is believed to be of sufficient importance to everyone concerned with the manufacture or use of rubber products to be reproduced here.

March 25, 1955

An announcement by GOODYEAR

of importance to every manufacturer of rubber products

Today is a most significant one to the rubber industry, t all American industry and to the Nation at large.

Today Congress has approved private production of synthetic rubbers and latices — and Goodyear thereby will become owner and operator of former Government-owned plants in Houston, Texas, and Akron, Ohio.

Under Government sponsorship, synthetic rubber made hurried but great strides forward. In four short, war-clouded years, it grew from little more than a laboratory oddity into a vital factor in our national security and economy.

Goodyear played an important role in the development of this modern miracle and in laying the foundation upon which it was built.

Goodyear researchers began work in earnest on synthetic rubber in 1925. Our first patent was dated 1927. Before the war we were operating our own plant, producing rubber superior to any previously made. In 1942, we began operation of the first Government-owned plant.

Synthetic rubber quickly became a real and essential part of our military, industrial and personal lives.

Today synthetic rubber stands on the threshold of even greater progress.

Today a new and stimulating ingredient—free enterprise—is added.

Goodyear looks upon this new ingredient as both a responsibility and a challenge.

It is a responsibility in view of unsettled world conditions and their threat to the supply and price of natural rubber.

It is a challenge in that it provides the opportunity to prove again the advantages of private enterprise.

Here, in broad terms, is how we propose to meet these new obligations:

1. **Through full realization of the importance of a strong synthetic rubber industry to our over-all economy and security.**
2. **Through maintenance, modernization and expansion of current facilities to meet a growing demand for synthetics.**
3. **Through a continuous, concentrated research and development program with new and better rubbers and latices as its objective.**
4. **Through the sale of a sufficient portion of our production to ensure free and fair competition within the rubber industry.**
5. **Through a constant emphasis on service and quality in the sale of our products to any and all of our customers.**

Our immediate plans call for continuing the manufacture of the rubbers and latices in current production at Houston and Akron.

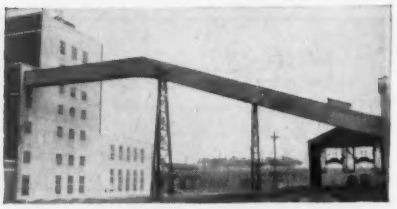
A number of improvements are already under way to provide our customers with rapid, continuous, reliable delivery and complete technical service.

This new venture into the manufacture of synthetic rubber may well be considered the opening of a new chapter in the history of the company and the industry. We fully intend to make it one of our proudest achievements.

P. W. Litchfield

Chairman of the Board, THE GOODYEAR TIRE & RUBBER COMPANY

Fabric helps boost coal —to power



Enclosed Hewitt-Robins conveyor belt at Duke Power Company's Lee Steam Station, Pelzer, S. C.

Problem: Boosting a half million tons of coal yearly 365 feet from ground level to bunkers 82 feet high at the Lee Steam Station of Duke Power.

A 36-inch wide conveyor belt was—and is—the answer. Because of the load and inclination, unusual tension develops in the belt. By using a specially constructed Wellington Sears "Shawmut" belt duck, Hewitt-Robins' engineers designed a 763-foot belt that withstands the tension successfully, performs with outstanding efficiency.

This belting has to be extraordinarily strong and durable. It is—carrying up to 500 tons of coal an hour, 425 feet a minute. Indeed, since stoppage would shut the Station down within a matter of hours, the belt is guaranteed by the manufacturer not to stretch excessively and thereby require re-splicing. It has not. Since installation in 1950, it has run seven days a week without being stopped for repairs.

This belting also conveys a basic idea. Wellington Sears has blue-printed fabrics for industrial progress for over a century. Whatever your fabric need, cotton or synthetic—for coating or impregnation—unparalleled experience and equipment are at your service. Write us for illustrated booklet, "Modern Textiles for Industry."

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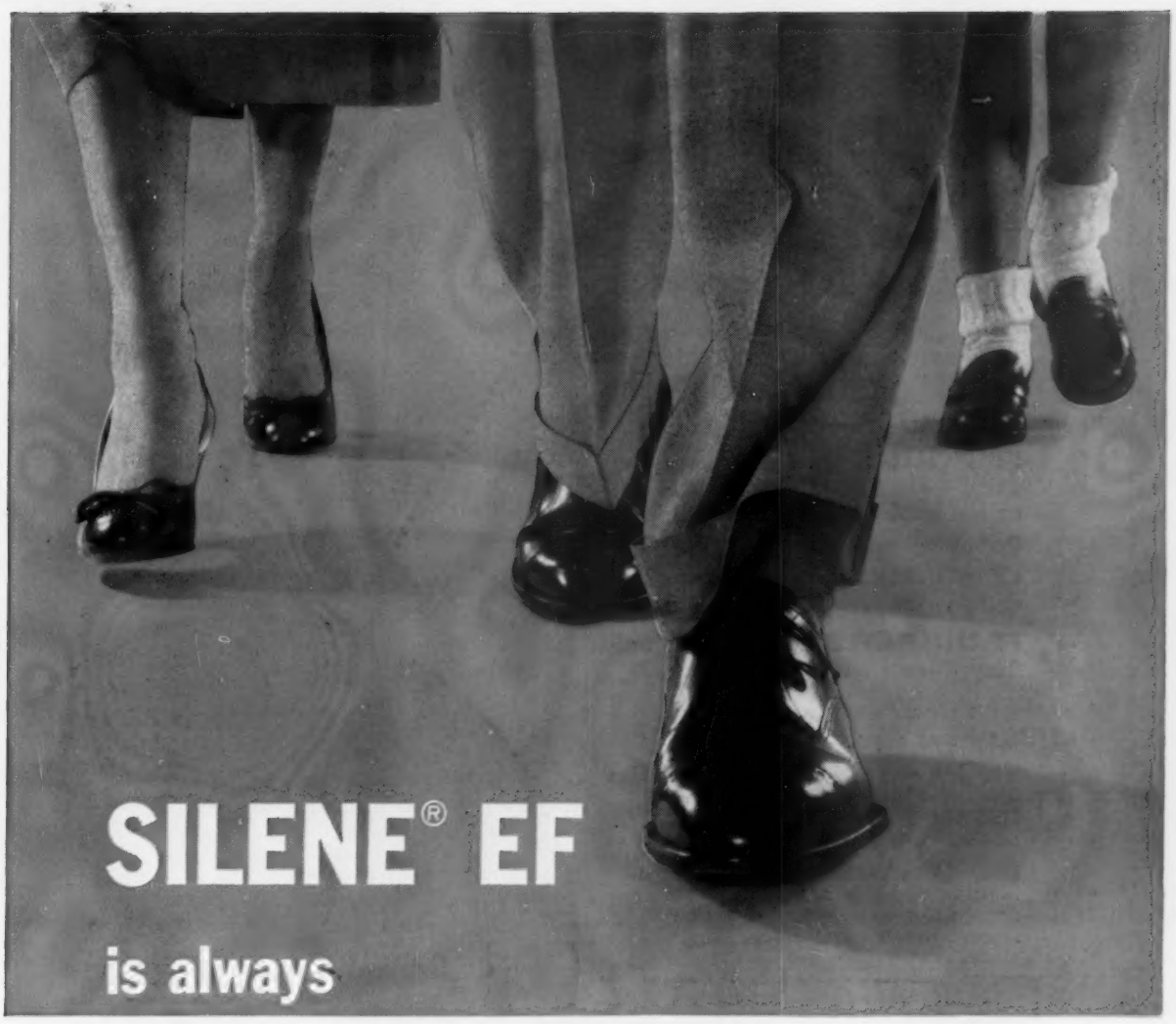


underfoot... and has been ever since its early days of production!

One of the first jobs done by Silene EF was its successful use in non-marking soles and heels, which today still keeps Silene EF the number one reinforcing pigment in soling.

The versatility of Silene EF has adapted it to the times. As new styles and products (such as cellular sponge) have come along in recent years, Silene EF remains in the new formulations as an outstanding value among the pigments available to soling compounders.

Outsoles, innersoles, slab, heels, toplifts, whatever the application, whatever the polymer . . . Silene EF does a superb job. If you are not already using Silene EF in your compounds, it will be worth your while to investigate this reinforcing pigment right away.

Contact Department Silene, Columbia-Southern Chemical Corporation, One Gateway Center, Pittsburgh 22, Pa., for complete information and working samples.

SILENE EF, an exclusive Columbia-Southern pigment, is a white, precipitated calcium silicate of very fine particle size. It is shipped in the form of friable agglomorates which normally break down under usual mixing procedures. Standard packaging is 50 pound multiwall paper bags.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati · Charlotte · Chicago Cleveland · Boston · New York · St. Louis · Minneapolis New Orleans · Dallas · Houston · Pittsburgh · Philadelphia San Francisco

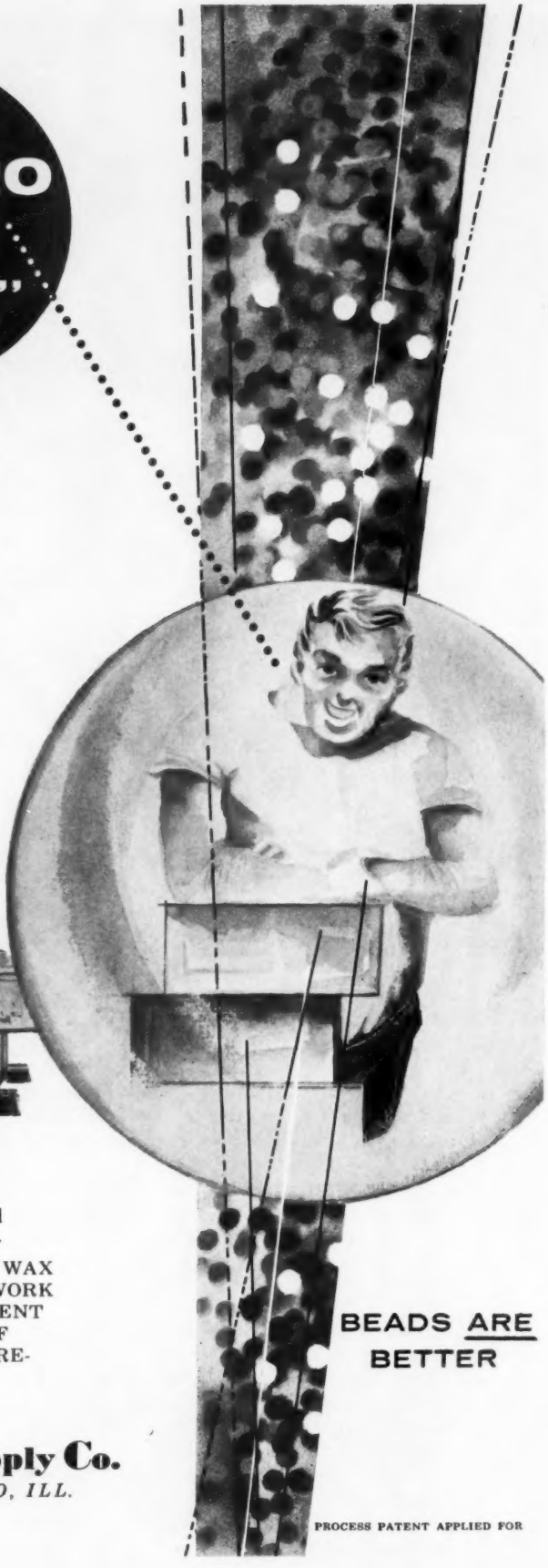
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

"IT'S A

PLEASURE

TO WORK WITH

DETERO WAX BEADS"



"I like Detero Wax because—

IT POURS easily—no messy flakes—will not stick in hot weather or hot mill rooms. Handles much more easily!

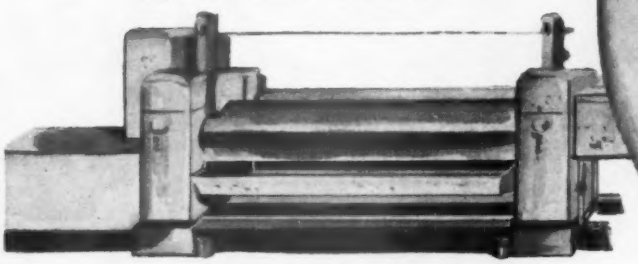
IT MEASURES so easily and quickly—no "approximate" weights!

IT DISPERSES easily and uniformly—cuts mixing time!"

A message to the man who BUYS the wax at your plant:

The man who *uses* DETERO WAX *likes* it because it makes his job easier—*but* DETERO WAX makes the product better, too.

Detero Wax has been tried and tested in rubber formulations, and has been proven to give superior protection against weather and ozone.



Specific wax blends for unusual rubber formulations can be beaded according to your specifications.

Blended DETERO WAX BEADS *speed* and *improve processing* and *improve the product.*

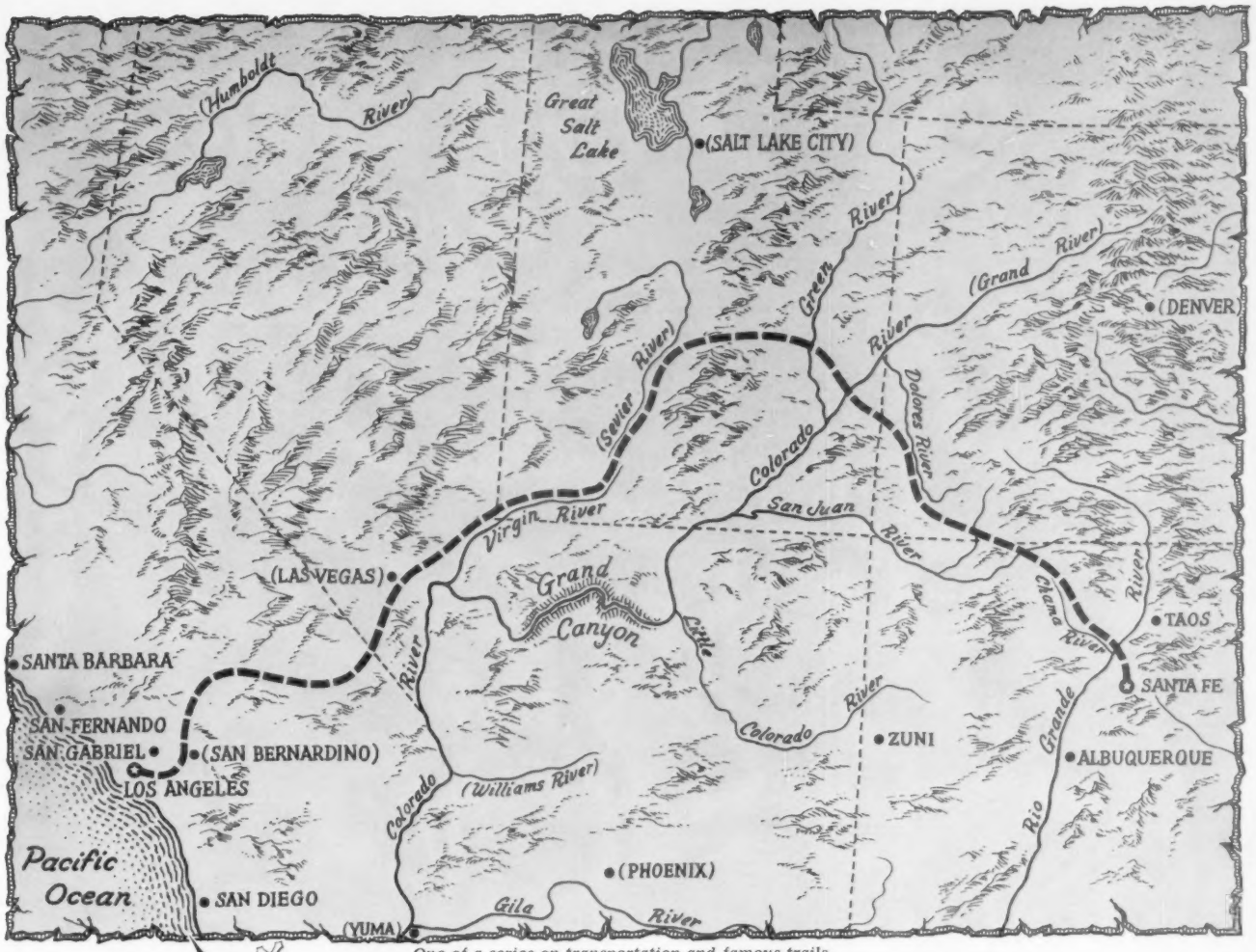
We have also developed special DETERO WAX BEADS for VINYL PLASTICS. LET US WORK WITH YOU—TO *IMPROVE* YOUR PRESENT PRODUCTS or in the DEVELOPMENT OF NEW PRODUCTS FOR SPECIAL REQUIREMENTS OR CONDITIONS.

BEADS ARE BETTER

American Maintenance Supply Co.

236 WEST NORTH AVENUE, CHICAGO, ILL.

PROCESS PATENT APPLIED FOR



One of a series on transportation and famous trails.

The Old Spanish Trail

On July 29, 1776, Fray Escalante and Fray Dominguez accompanied by eight soldiers left Santa Fe in an endeavor to open up direct lines of communication between Santa Fe and Monterey, California. Proceeding northwest up the Chama River, they crossed the Colorado and the Green rivers, proceeded to a point near what is now Provo, Utah. Turning to the southwest, they were blocked from further westward travel by the heavy snows in the mountains, got back to Santa Fe January 3, 1777.

In the early 1830's, Ewing Young and a company of trappers, one of whom was probably Kit Carson, made a fur-hunting tour of the western valleys. Other trappers and traders quickly followed, taking the trail through Taos, cutting off the old Escalante-Dominguez trail at a point on the Green River. There developed from these journeys a brisk trade between Santa Fe and California, mainly confined to the exchange of New Mexican blankets and woven materials for the mules and horses of California.

Thus was joined in the southwest the trails which converged on Santa Fe — one which came from the east, another from El Paso and Chihuahua. Another link was forged connecting the Atlantic with the Pacific.

How far man has come in his ability to transport himself and the products of his handiwork. Modern highways today crisscross the trails which the explorers, the trappers and traders made from Santa Fe to the west coast. What a miracle it would seem to any of those valiant men to see the products of California's farm and factory in eastern, southern and midwestern cities in a few score hours after leaving the Sunshine State. The rubber tire has speeded man's ability to progress. Dependably and swiftly, it takes man anywhere he wishes to go. Today's rubber tire has longevity and durability, characteristics which are imparted by carbon black. UNITED BLACKS, constantly improved and perfected as a service to the rubber industry, provide the durability and strength which give tires their long-wearing characteristics.

UNITED CARBON COMPANY, INC.

Dixie 50, Fast Extrusion Furnace Black (FEF), appeals most to compounders coping with processing and reinforcement problems.

Dixie 50 is peer among blacks when extrusion needs are greatest. It tubes fast, smooth, true to gauge and is consistent.

Dixie 50 has strength. It is a "natural" for stepping up the processing and reinforcement of lesser reinforcing blacks. It blends perfectly with upper abrasion level blacks and eases their processing.

For blacks with quality distinction go UNITED. Leaders in the rubber industry bank on UNITED blacks. Stay with them.

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NON-METALLIC *PROCESSING REQUIREMENT*

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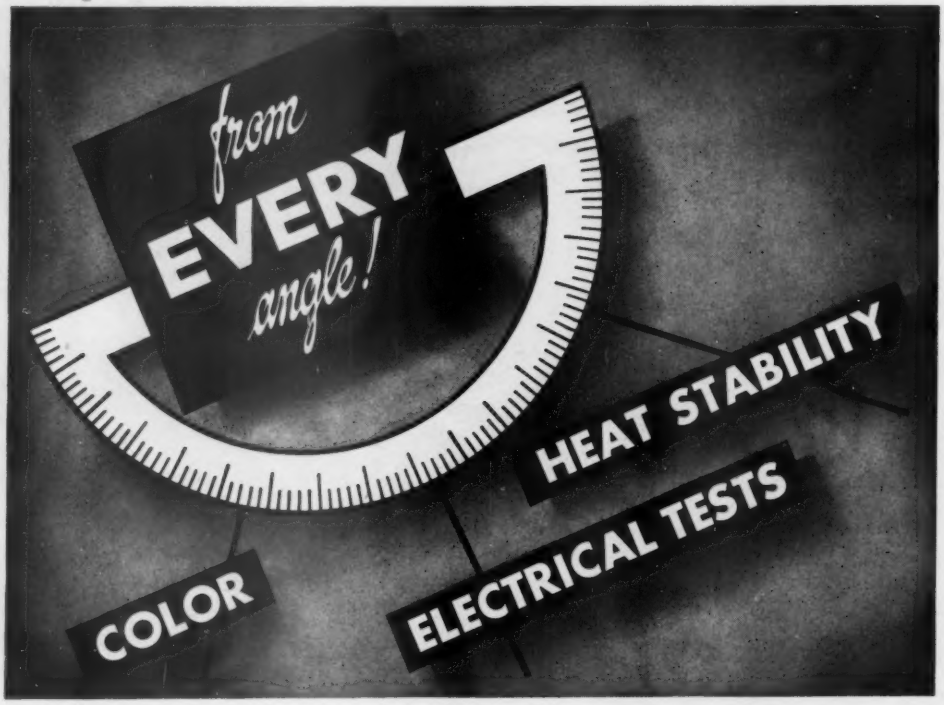

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for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

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EXTRUDED GOODS

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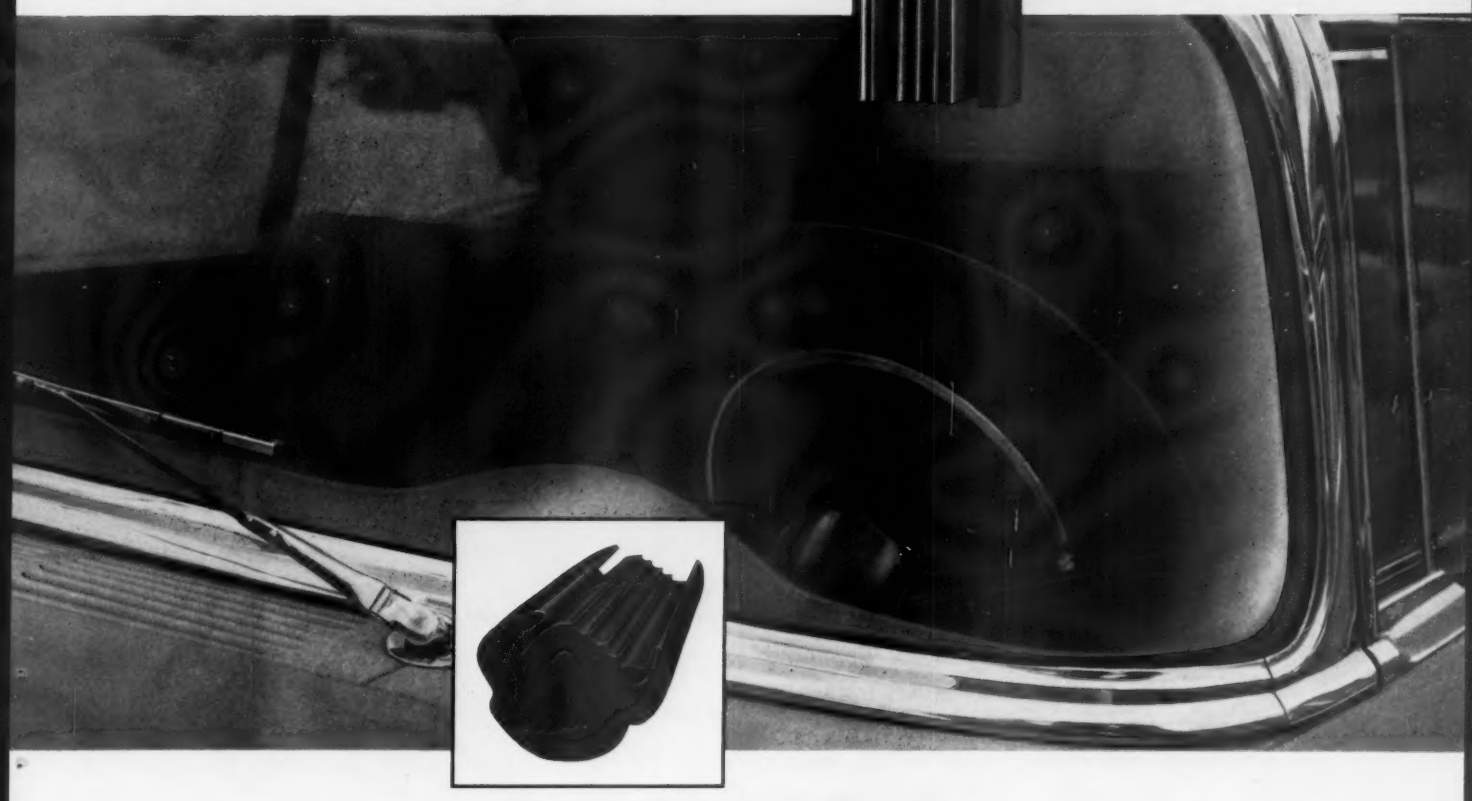
SMOOTHOUT OIL FURNACE CARBON BLACK



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Smooth Extrusion *for Open Steam Curing*

Non-Staining *does not Cause Migration Staining of Organic Finishes*

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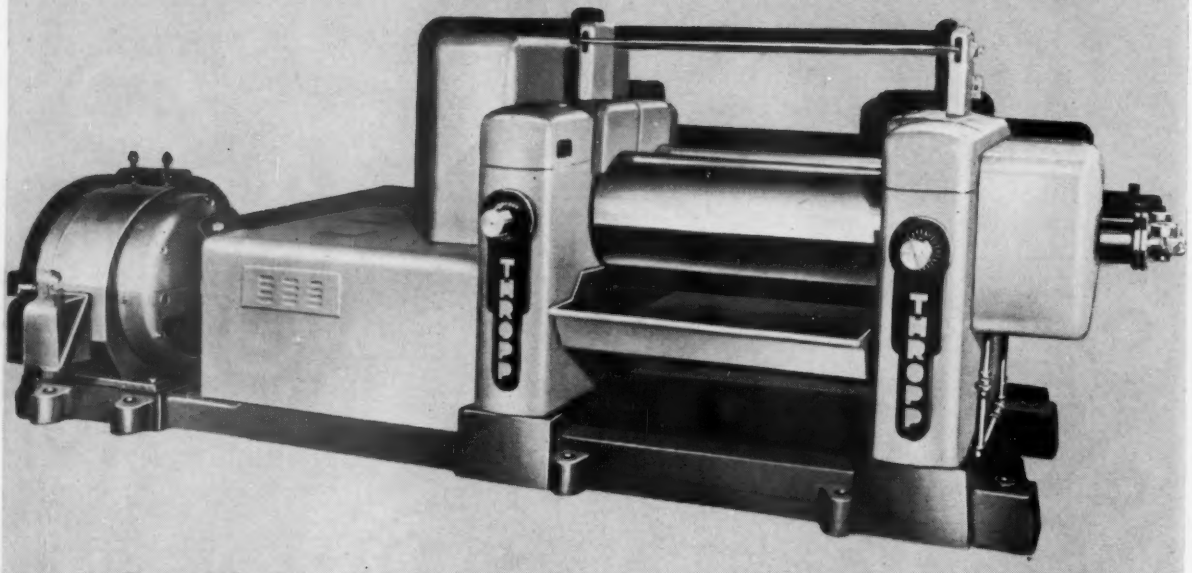
**FEF—Fast Extruding Furnace Black*

The THROPP 60" MILL

earns the confidence of management



Thropp 22" x 22" x 60" Mill

This clean, streamlined Mill is a real workhorse, designed and built in every detail for dependable, uninterrupted production in the Rubber and Plastics Industries.

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Wm. R. THROPP & Sons

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REDUCE PROCESSING TIME WITH...

SYNTHOL

TACKIFIER AND PLASTICIZER

- EXCELLENT TACK
- QUICK MILLING
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PROVIDES TACK and FAST BREAKDOWN IN ALL SYNTHETIC, NATURAL OR RECLAIM STOCKS

Here is a tackifying agent that embodies the dual properties of a softener for plasticizing, together with extreme tack in all types of rubbers— natural, synthetic, or reclaim. Molding defects incident to dry stocks are minimized along with a noticeable reduction in shrinkage. SYNTHOL is an unexcelled material for "bringing back" scorched stocks. Even ground cured scrap which might be considered worthless can in many cases be turned into a profit through the use of SYNTHOL. Write for a sample.

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Drum . . . . . 475 lbs. net
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A Word of Farewell

Greetings to our many friends in the Rubber Industry:

Since gas carbon black first came into existence the name Binney & Smith has been intimately connected with its distribution, technical service and scientific advancement. The founders of this company were pioneers in the early development of carbon black and were largely instrumental in the establishment of America's leading carbon producers.

Now we step aside leaving it to our principals, Columbian Carbon Company, to serve you direct. In doing so we look back with pride on the standing you have accorded us over the years. In particular we are grateful for the splendid friendships that have resulted and always we will cherish the pleasant memories of our association with you in the rubber field.

●

BINNEY & SMITH INC.

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Special Purpose Hevea Rubber

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AIRDRIRUB*

Concentrated Hevea Latex

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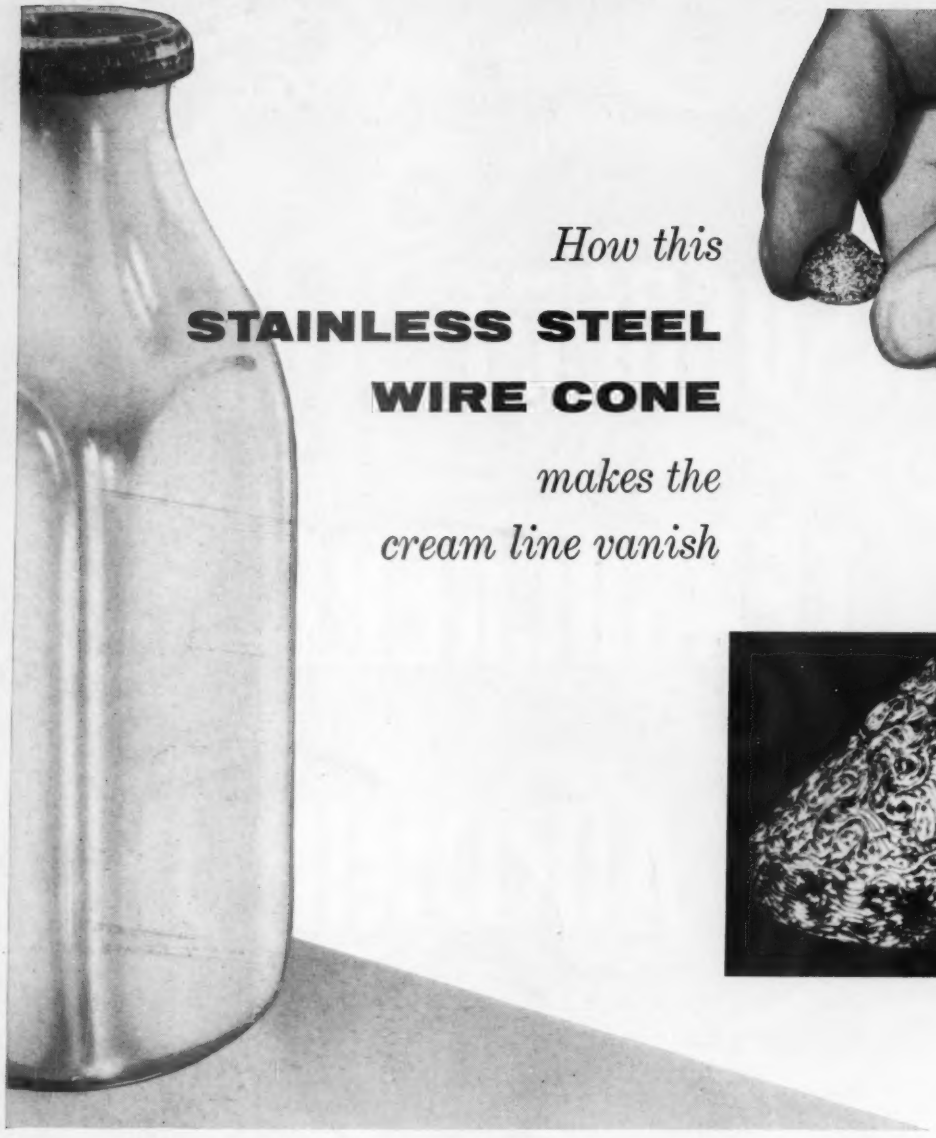
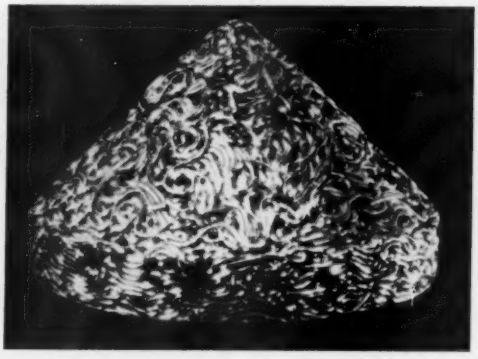


How this

STAINLESS STEEL WIRE CONE

makes the cream line vanish



● All of the cream that used to rise to the top of a bottle of milk is still there. But now you can't see it. Homogenizing has permanently blended the cream into the milk.

The heart of a homogenizer is a porous cone formed of crimped stainless steel wire through which the milk is forced at high pressure.

Ordinary wire couldn't take the combination of tight crimping and severe forming without fracturing. And it was too unstable to avoid matting and distortion under the processing pressure.

National-Standard research teams solved each of these problems so that the dairy industry could have better homogenizing equipment. And we stand ready at all times to work on any problem that will give *you* better and more versatile products made from wire, wire cloth or steel strip. Call us and see.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

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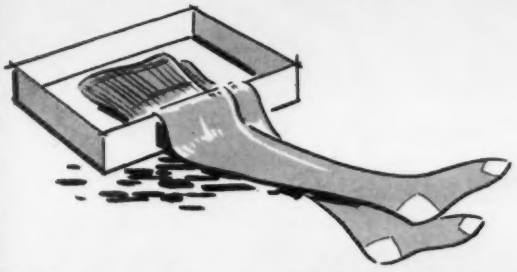

RIGHT FILLER CAN MAKE

4 *Quality Controlled* EXTENDER PIGMENTS

produced to cut production costs for rubber compounders

GAMACO

		For use in:
Water Ground		
Dry Brightness	97%	insulated wire
Particle Size Range	0.5-15 microns 98.5% minum 10 microns	footwear
Mean Particle Size	2.5 microns	extruded stocks vinyl sheeting & flooring organosols plasticols plastigels

CALWHITE

		For use in:
Water Ground		
Dry Brightness	96%	molded goods
Particle Size Range	2-30 microns 75% minum 10 microns	extruded goods footwear belting
Mean Particle Size	6.5 microns	low specification insulated wire

5-25

		For use in:
Water Ground		
Dry Brightness	95%	rubber & vinyl floor tiling
Particle Size Range	75% between 5 and 25 microns	latex compounds
Mean Particle Size	12.5 microns	

No. 10

		For use in:
Dry Ground		
Dry Brightness	92-94%	belting
Particle Size Range	5-44 microns	footwear latex compounds & rug backing
Mean Particle Size	17 microns	any heavily loaded rubber compounding

Why not test their excellent properties in your own laboratory. Write for samples and full technical information. There is no obligation.

C the Georgia P Marble D Company

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THE GEORGIA MARBLE COMPANY • TATE, GEORGIA

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when

a manufacturer of rubber products thinks of supply... he should think of Shell Chemical Synthetic Rubber, available in several types, delivered promptly, by the bale or by the carload...

Get in touch with Shell Chemical Corporation, Synthetic Rubber Sales Division, P. O. Box 216, Torrance, California.

SHELL CHEMICAL CORPORATION
SYNTHETIC RUBBER SALES DIVISION

SHELL

RELIABLE ZINC OXIDES

AZO-ZZZ-44 and AZO-ZZZ-55 assure good dispersion and easy processing because of their uniform particle size and absence of extreme fines. With AZO-ZZZ-11, 22, 33, (Acicular types) and special grades, a complete range of zinc oxides is offered for every rubber requirement.

A RELIABLE SOURCE

American Zinc assures an uninterrupted supply of zinc oxide. Recent discovery and development of a new, large ore body, added to previous American Zinc reserves, provides sufficient ore to last many years at the current rate of production.

AZO ZZZ-44 ZZZ-55

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NEW, LOW-VISCOSITY CHLOROWAX®

speeds vinyl compounding

Now, DIAMOND's new, low-viscosity secondary plasticizer . . . CHLOROWAX LV . . . offers vinyl processors another way to reduce costs and improve quality. CHLOROWAX LV can give you all the advantages of Chlorowax 40, plus additional ease in handling and faster blending.

Viscosity of CHLOROWAX LV falls in the five poise range at 25° C.—a substantial drop from the 20- 40 poise range of normal 40% chlorinated paraffins. Viscosity of CHLOROWAX LV approaches that of commonly employed primary plasticizers. Plant handling is speeded because of greater flow rates.

Better fluidity tends to give flexible plastics better physical characteristics at low temperatures and is an added advantage in plastisol formulations requiring fluidity.

Greater stability of CHLOROWAX LV is important when processing heat is required and results in products with better stability and aging characteristics.

For information or technical co-operation in the use of CHLOROWAX LV or any other CHLOROWAX product (CHLOROWAX 40, 50, 70 and 70-S), write DIAMOND ALKALI COMPANY, Chlorinated Products Division, 300 Union Commerce Building, Cleveland 14, Ohio.

Notice how readily CHLOROWAX LV pours at room temperature. Can this speed handling and blending in your plant?

CHARACTERISTICS OF CHLOROWAX LV

Specific Gravity	1.13
Weight—Pounds Per Gallon	9.4
Viscosity—Poises 25°C.	5.1
Viscosity—S.U.S. 100°F.	902
Viscosity—S.U.S. 210°F.	70
Chlorine—Per cent	40
Solubility in Water	None
Toxicity	Non-Toxic
Odor	None
Flammability	Non-Flammable

DIAMOND CHEMICALS

Diamond Chemicals

DIAMOND CHEMICALS

SALES OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

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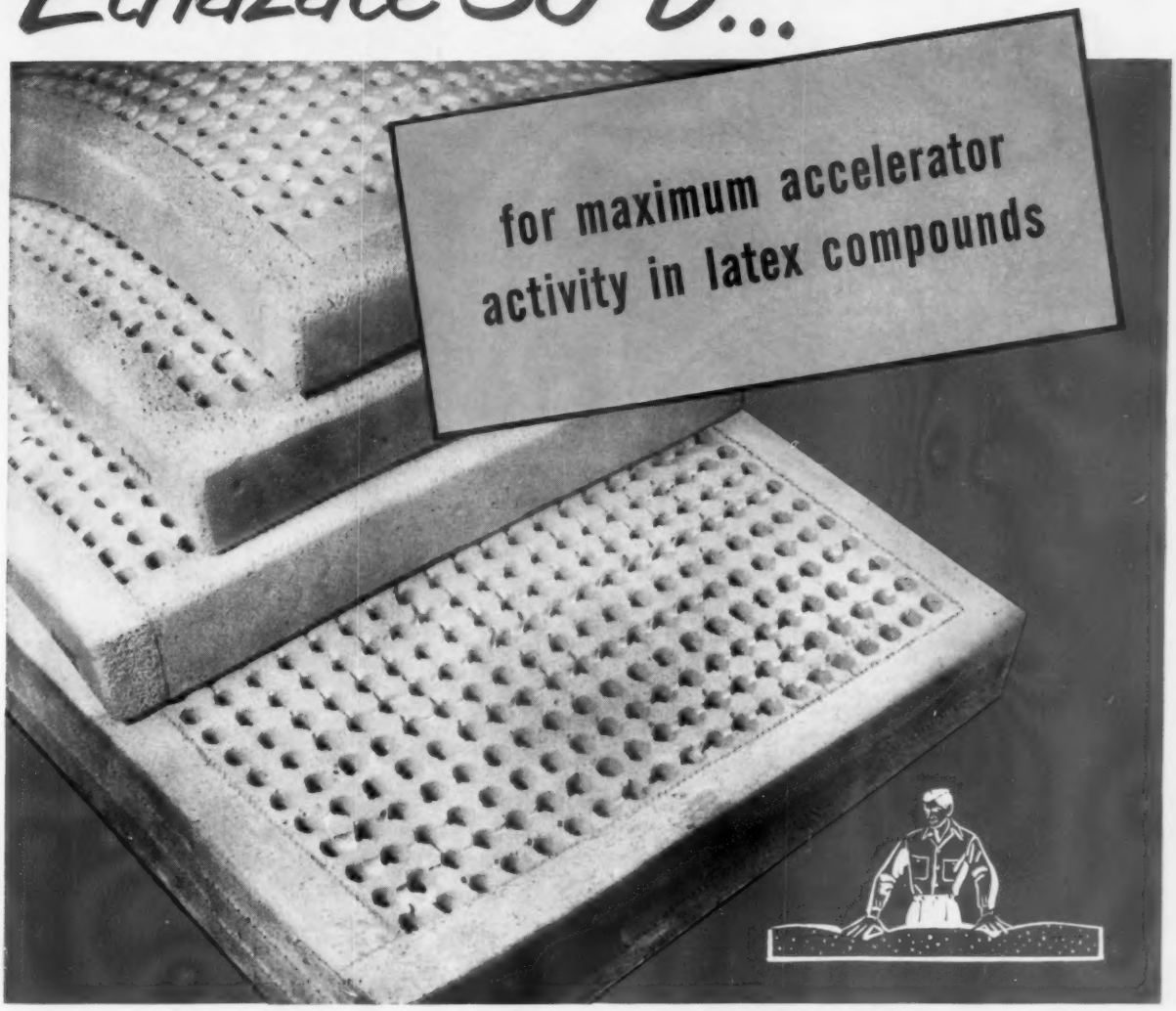
Ethazate 50-D...



Ethazate 50-D is a fast low-temperature latex accelerator...*a stable dispersion* in water containing 50% active accelerator by weight.

Designed for latex compounds, such as foam sponge, Ethazate 50-D is a fine particle size zinc diethyl dithiocarbamate. It is a stable dispersion which assures maximum accelerator activity and compatibility with the compounded latex. It is also unique in its freedom from water soluble, ionizable salts and other objectionable impurities.

Developed by the world's leader in rubber chemicals, Ethazate 50-D is most commonly used in combination with thiazole type accelerators, such as OXAF, the zinc salt of mercapto benzothiazole.

If you are producing latex foam sponge, or similar latex products, it will pay you to investigate the advantages and benefits of Naugatuck's Ethazate® 50-D. For bulletin No. 198, or for technical information on *any* of Naugatuck's rubber chemicals, write on your letterhead to the address below.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario
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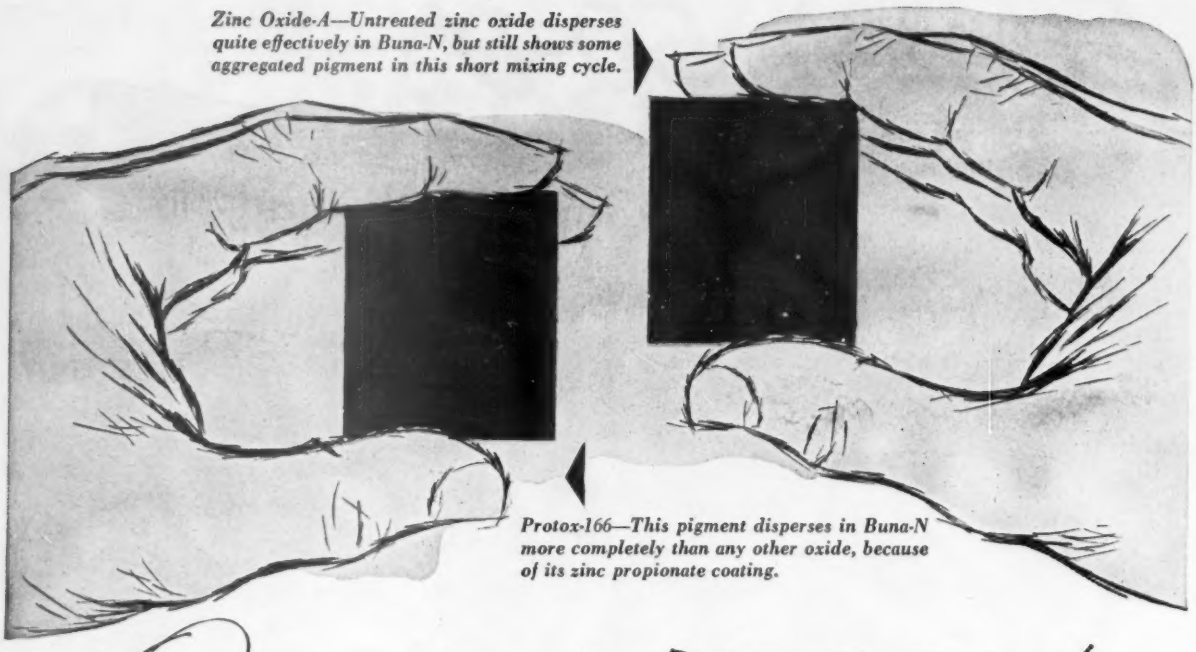

Zinc Oxide-A—Untreated zinc oxide disperses quite effectively in Buna-N, but still shows some aggregated pigment in this short mixing cycle.

Protox-166—This pigment disperses in Buna-N more completely than any other oxide, because of its zinc propionate coating.

Outstanding for DISPERSION

...PROTOX* ZINC OXIDES

Protox oxides speed your processing and upgrade your compounds . . . because they disperse faster and more completely than conventional oxides, even under adverse conditions.

IN ANY WEATHER

One of our first customers for Protox was a rubber manufacturer who was troubled by poor zinc oxide dispersion on hot, humid days. Protox-166 eliminated that difficulty.

IN ANY RUBBER

Protox oxides definitely plasticize Buna-N and other hard-to-process elastomers, thus providing softer, easier-working stocks.

This plasticizing effect does not hinder the dispersion of Protox oxides, because their unique coating of zinc propionate serves both as plasticizer and dispersing agent.

Where can Protox oxides cut your costs and improve your compounds?

We shall be glad to discuss that question with you.

*U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

For great versatility in cure rate—

NEOPRENE TYPE W

An all-purpose elastomer—not a specialty

Moderate Rate of Cure—Very safe processing
Use combination of
Thionex 0.5 part per 100 of neoprene
DOTG 0.5 part per 100 of neoprene
Sulfur 1.0 part per 100 of neoprene

Fast Curing—Moderately safe processing
Use combination of
NA-22 1.0 part per 100 of neoprene
MBTS 1.0 part per 100 of neoprene

Very Fast Curing—Some scorching tendency
Use NA-22 0.5 part per 100 of neoprene

See Elastomers Division Report:
BL-281 "Acceleration of the W Types of Neoprene".

E. I. du Pont de Nemours & Co. (Inc.)
Elastomers Division

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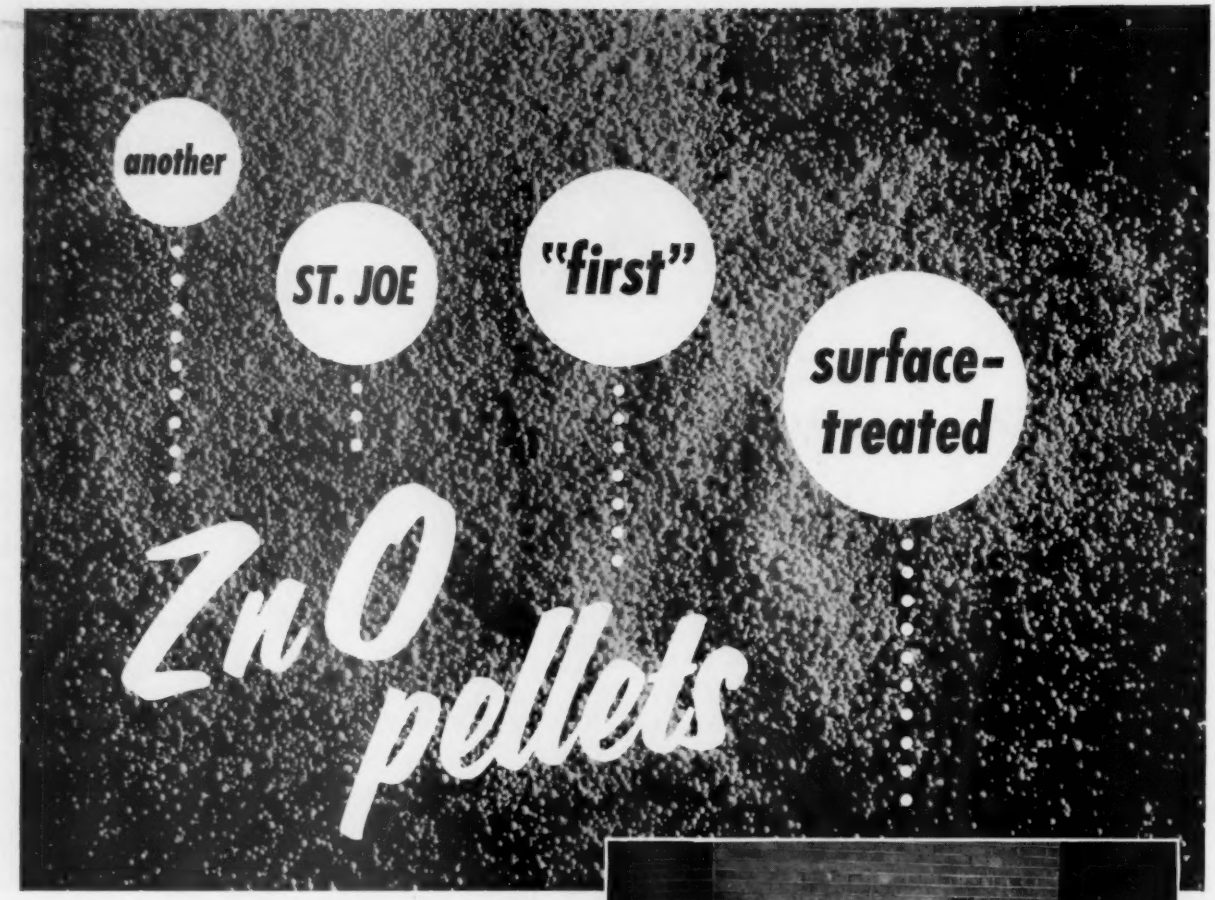

Photo of St. Joe surface-treated Zinc Oxide in pellet form, actual size.

(Note reduction in storage space required)

THE ST. JOSEPH LEAD COMPANY is now ready to ship ST. JOE surface-treated ZINC OXIDE in pellet form to consumers in the rubber industry. This "new look" in our product has been worked out successfully with a number of our customers. They have adopted it for all their shipments because – after repeated factory tests – the use of ST. JOE surface-treated ZINC OXIDE in the new pellet form was found to offer the consumer these definite advantages:

- *Free-flowing—improved handling properties*
- *Freedom from dustiness—better plant housekeeping*
- *Faster incorporation in rubber*
- *Superior dispersion in rubber*
- *Less storage space required owing to 50% increase in apparent density*

For your next shipment, specify ST. JOE surface-treated ZINC OXIDE in PELLET FORM

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE, NEW YORK 17 *Plant & Laboratory, Monaca (Josephtown) Pa.*

WITCO REPORTS ON 35 YEARS OF PROGRESS

Back when most auto tires gave only 3,000 miles of service, Witco became a supplier of carbon black to the rubber industry. That was 1920. The subsequent development of reinforcing blacks for improved wearing qualities played a big role in the steady development of the rubber industry. Today, after contributing to the growth of carbon black usage for 35 years, WITCO-CONTINENTAL operates five up-to-date carbon black plants manufacturing a complete line of furnace and channel blacks.

Through the years, service has been an important part of our business at Witco-Continental. Customers have come to rely on our technical service laboratories for assistance with their problems. And they have found that it's easy to arrange prompt deliveries through our local sales offices in every major industrial area—nine in the U.S. and two in England.

Industry's call for more and more of our products has promoted a long-term growth pattern at Witco-Continental, one which is still in progress. By diversifying products and integrating service to meet the needs of the rubber and chemical manufacturers, Witco has shared in the fabulous growth of these industries.

It is significant that our 35th anniversary marks the most important years of progress in the industries we serve—as well as 35 years of growth for Witco.

For more information on WITCO-CONTINENTAL Carbon Blacks, send for literature or call our nearest sales office.

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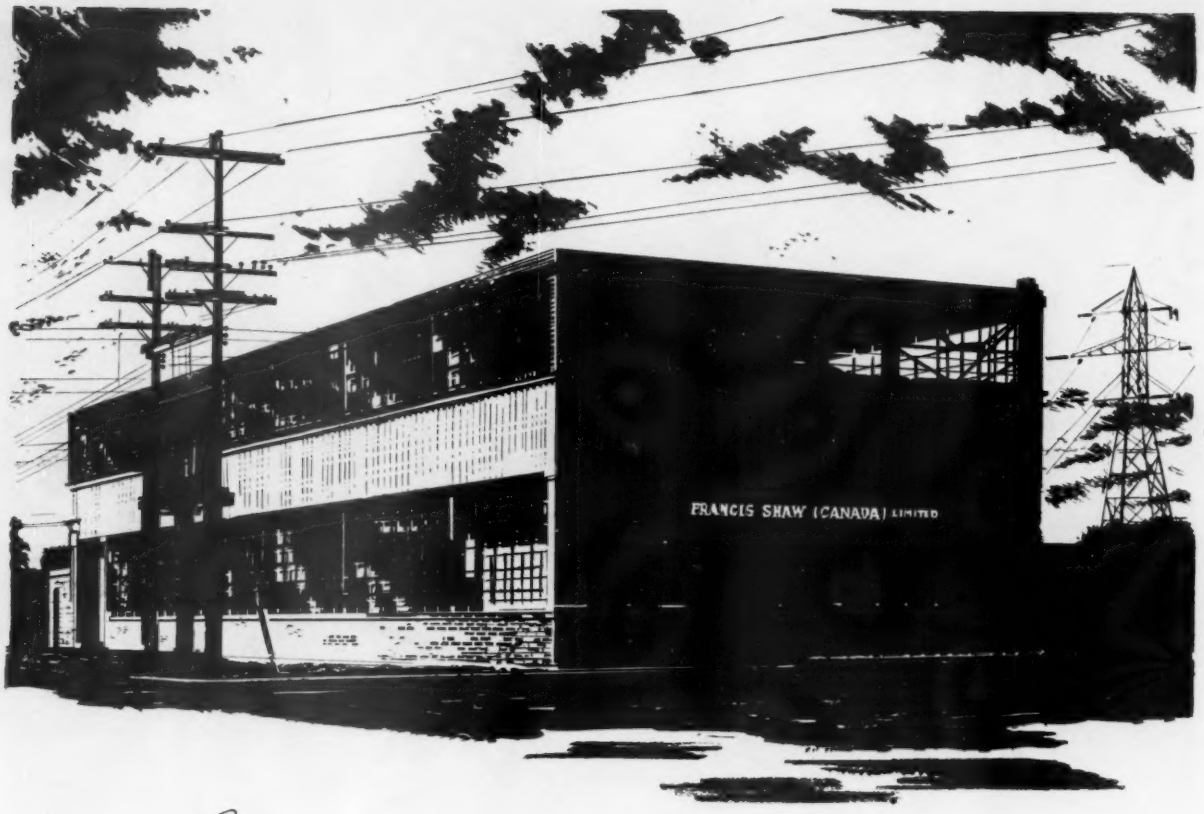

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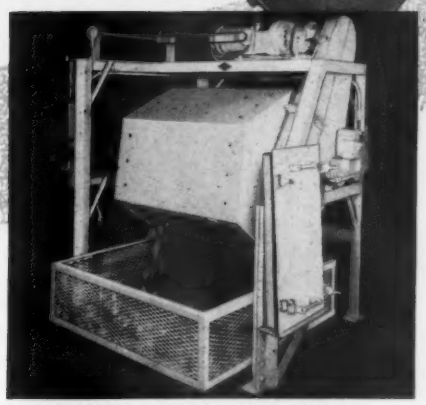

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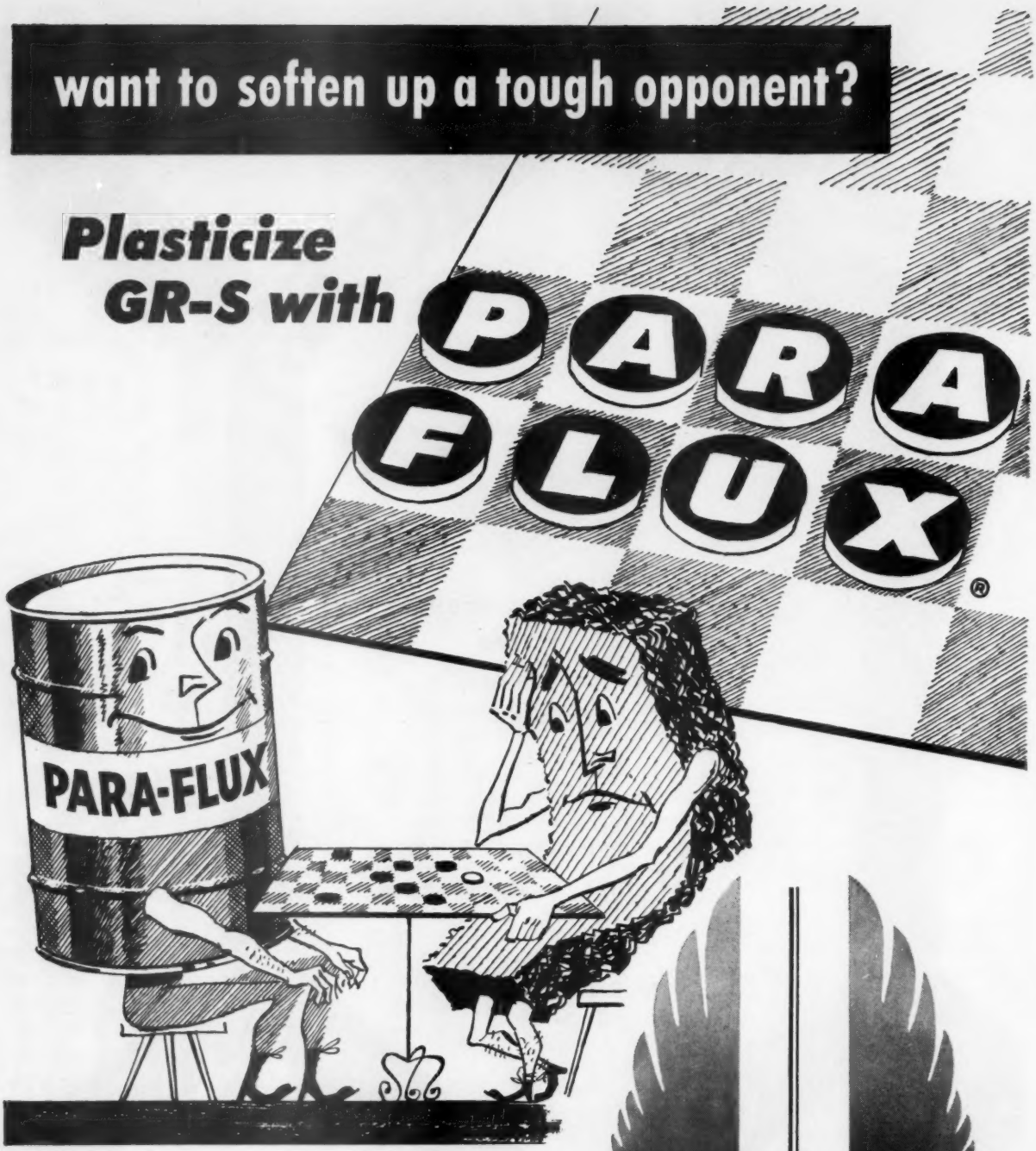

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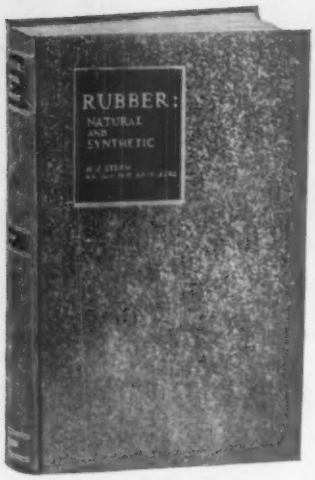

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Dr. Stern has been engaged as a chemist in the rubber industry for more than 25 years and since 1935 has practiced successfully in London as a Consultant. He is the author of "Practical Latex Work" and of many publications concerned with the scientific and technological aspects of natural and synthetic rubber.

SUMMARY OF CONTENTS BY CHAPTERS

Part I

1. **Historical Introduction; Mastication; Vulcanization.**
2. **Plantation Rubber.**
3. **Natural Rubber: Composition, Reactions, Derivatives.**
4. **Properties of Vulcanized Rubber.**
5. **Compounding Ingredients.**
6. **Rubber Machinery; Solvents and Solutions; Reclaiming.**
7. **Latex.**

Part II

8. **Synthetic Rubber (History and Development).**
9. **Manufacture and Technology of Synthetic Rubbers.**
10. **Synthetic Rubber Latices.**
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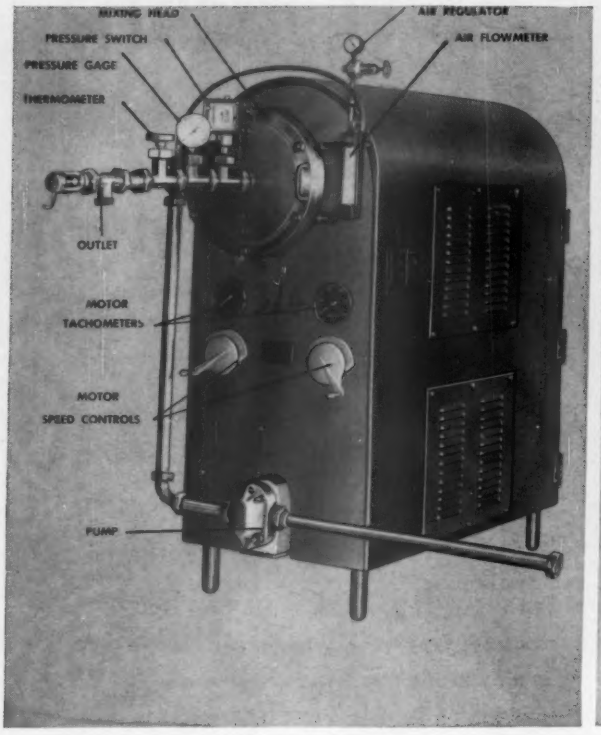
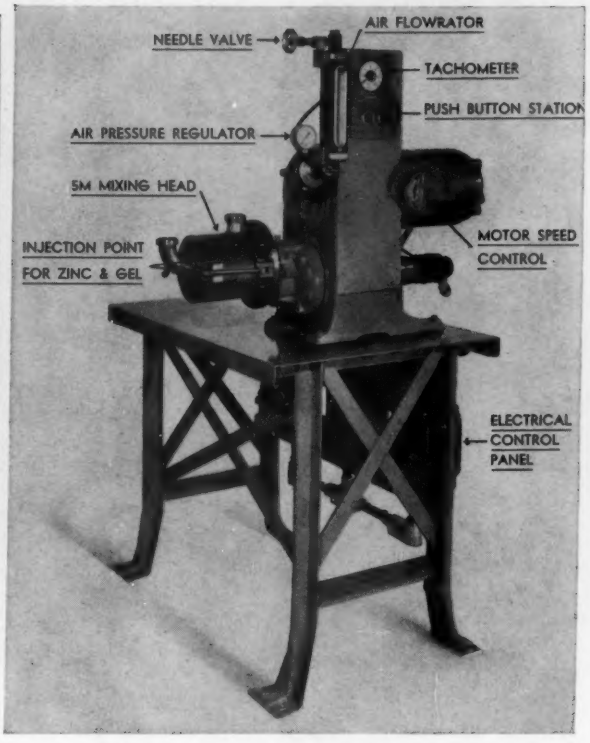


OAKES CONTINUOUS AUTOMATIC MIXER



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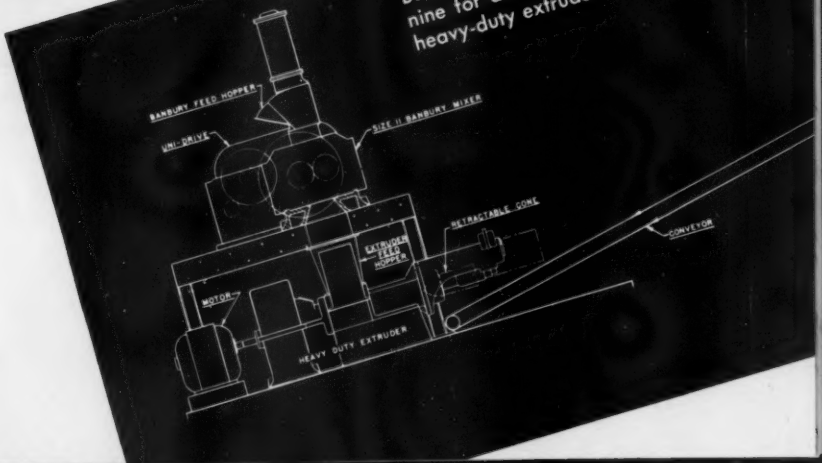
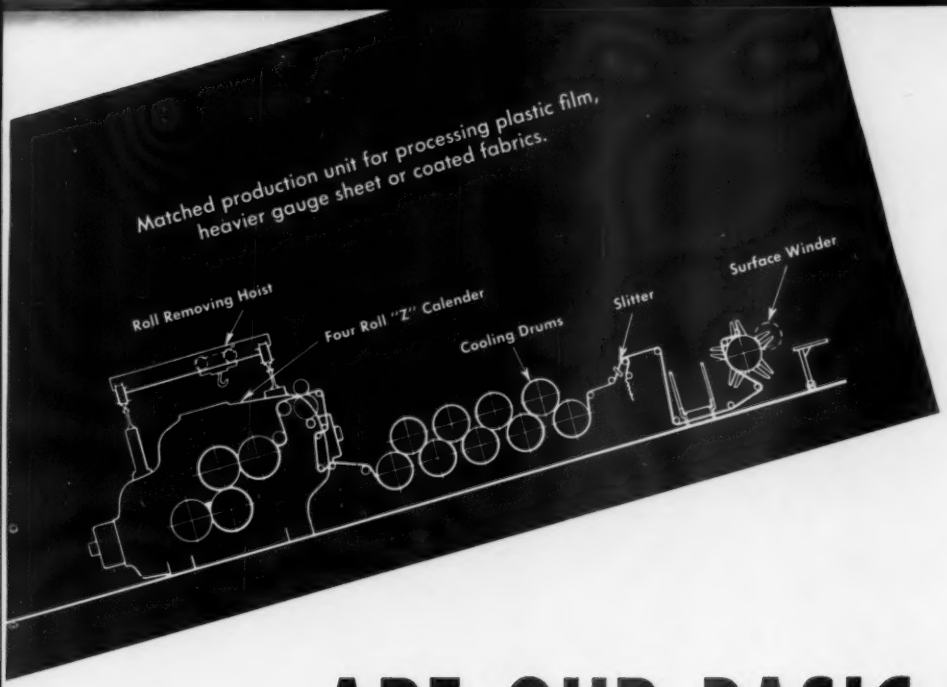
IDEAS

Rubber pelletizing and slabbing systems.



Banbury® mixer installed on mezzanine for direct feed into hopper of heavy-duty extruder.


Matched production unit for processing plastic film, heavier gauge sheet or coated fabrics.
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Four Roll "Z" Calender
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FB-1012

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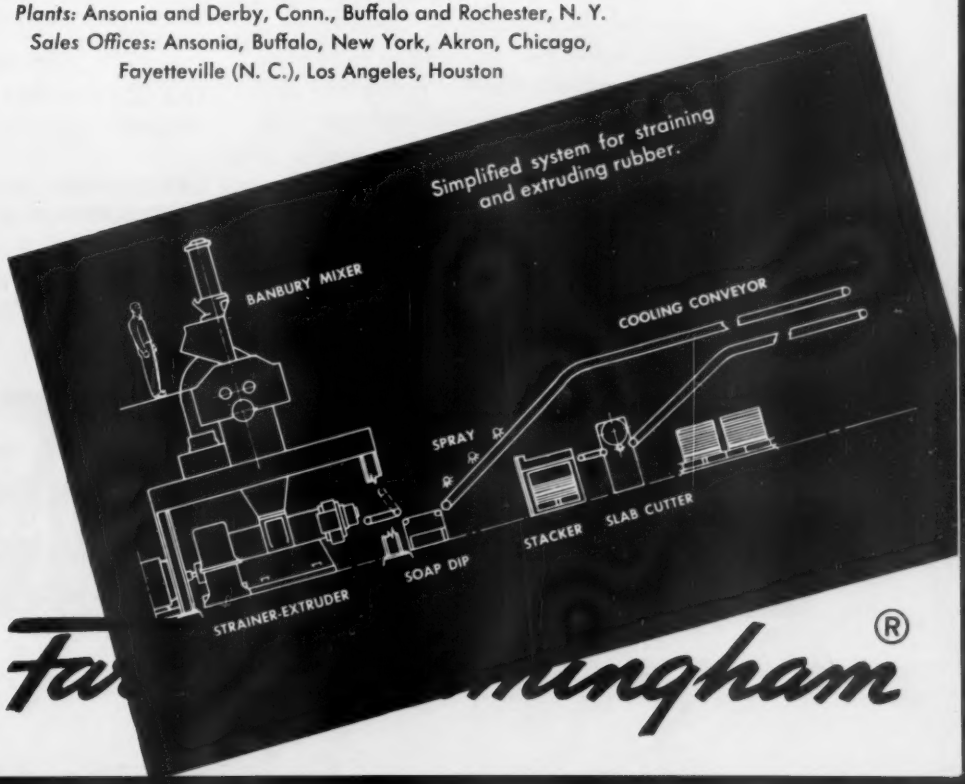

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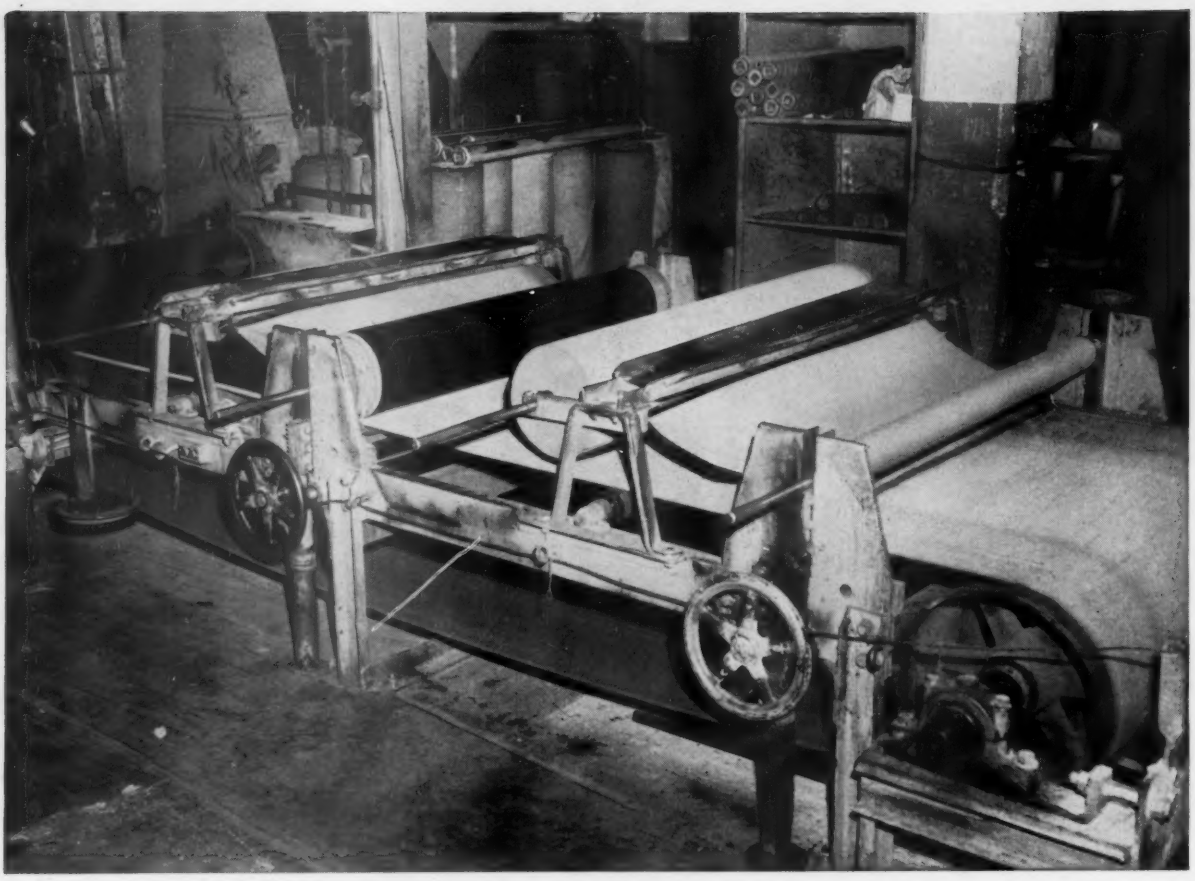

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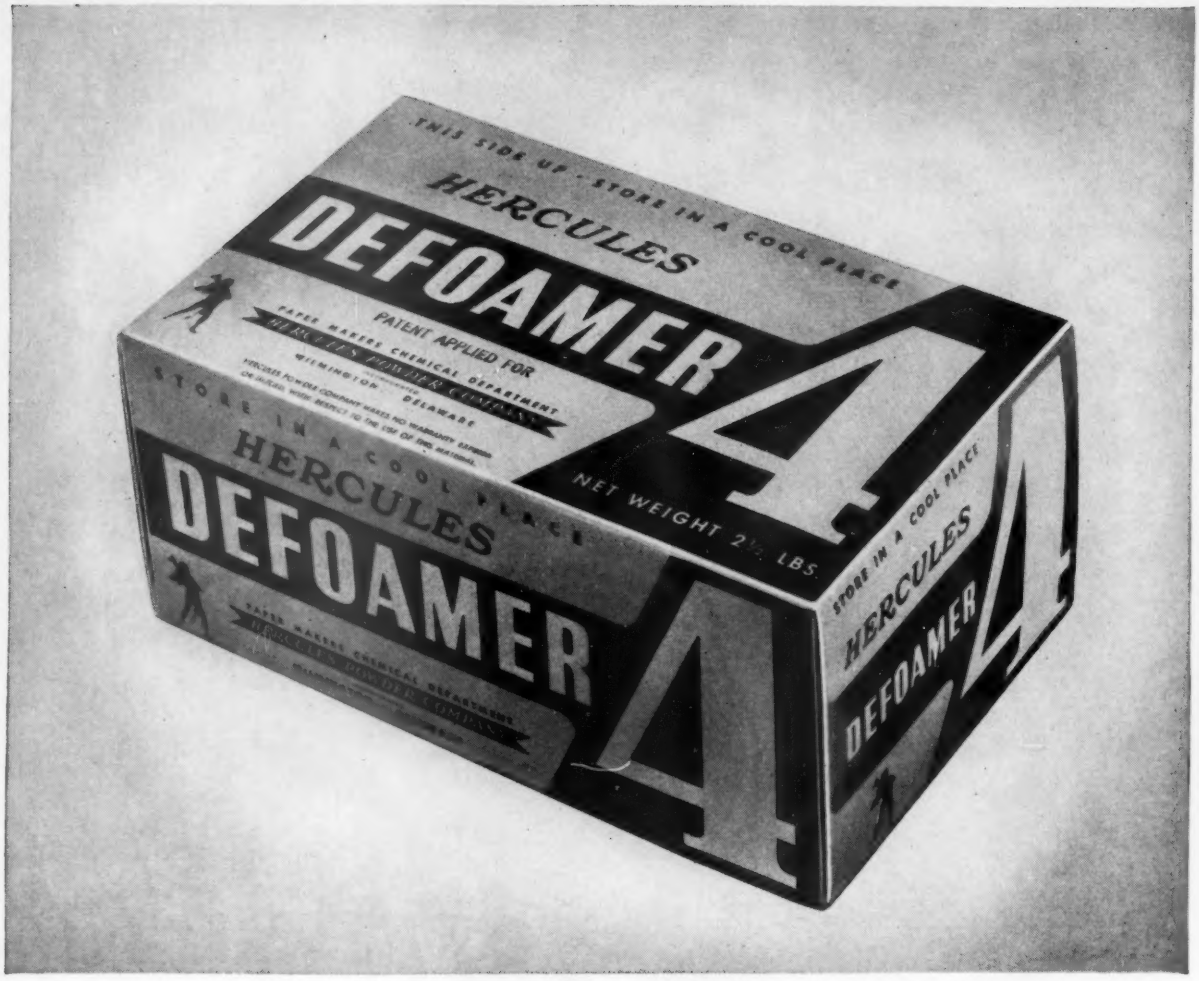

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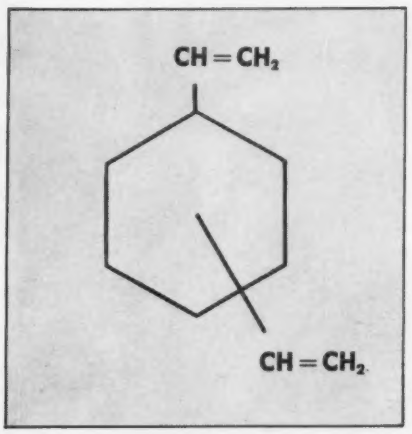

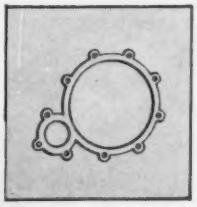

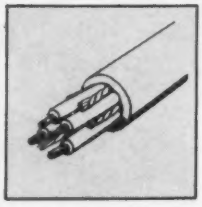

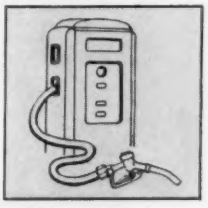

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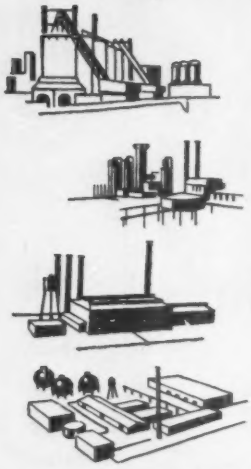

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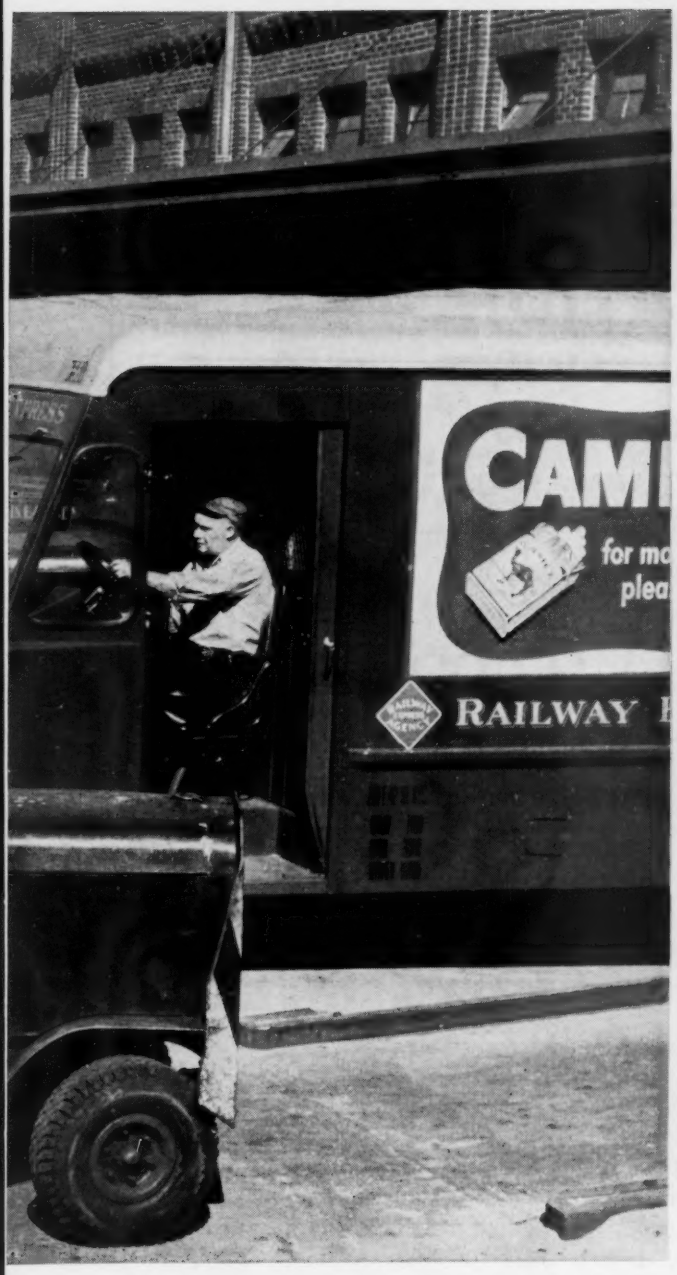

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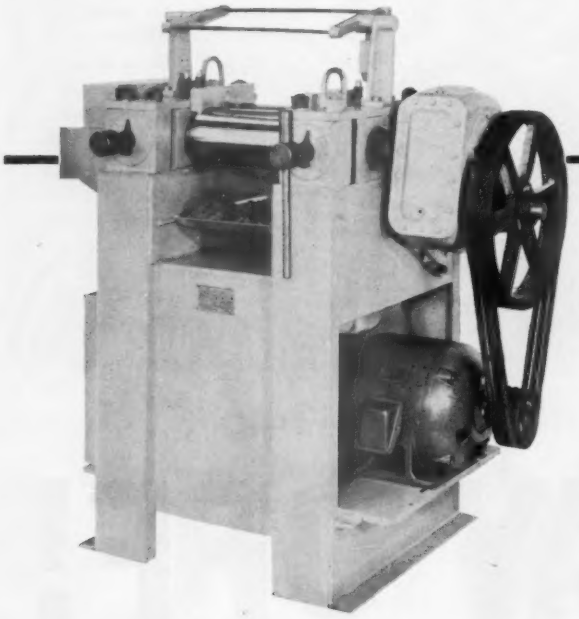

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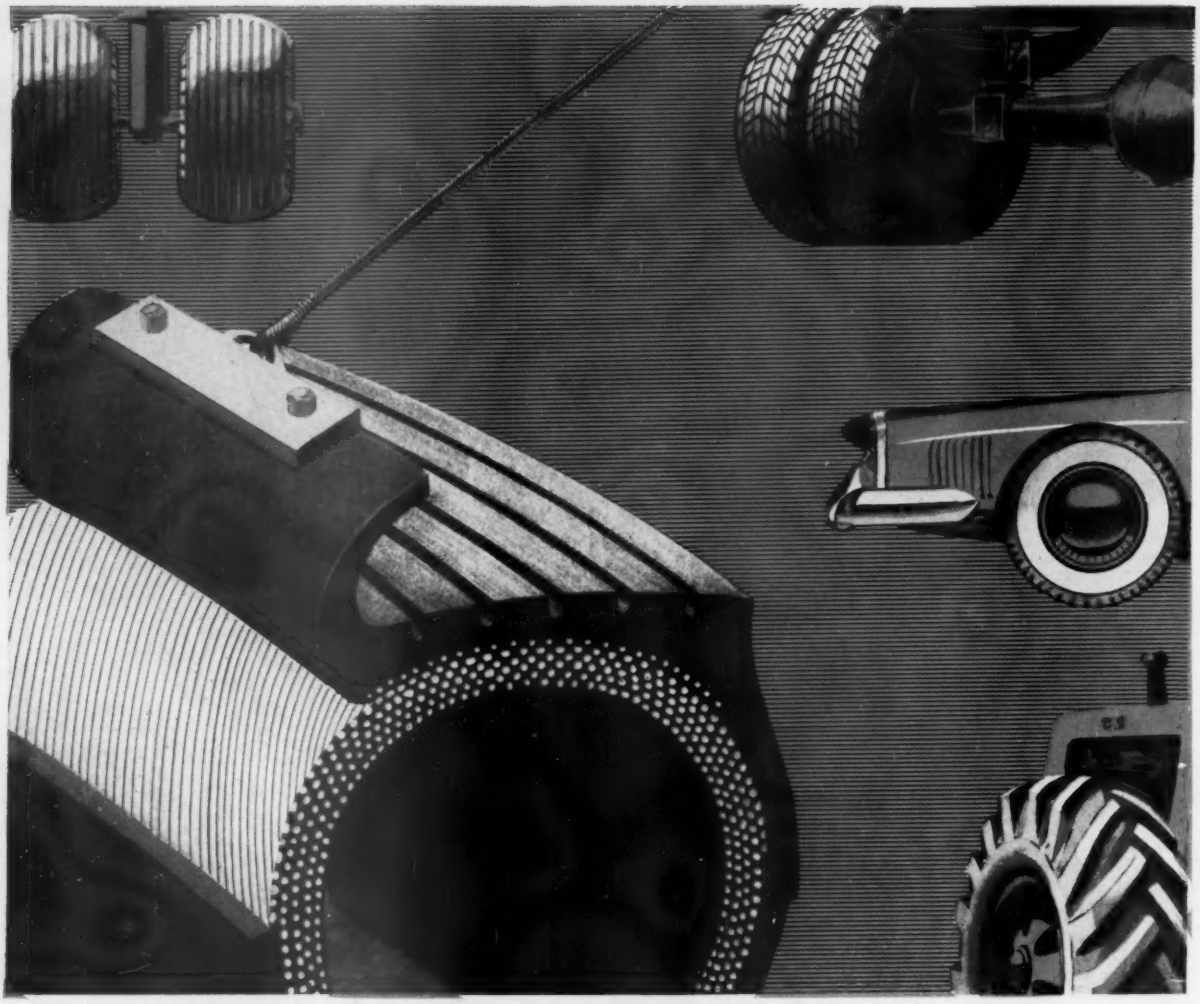

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Rubber Age

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Rubber Hardness Testing

By J. R. SCOTT

Director of Research, Research Association of British Rubber Manufacturers, Shawbury, Shrewsbury, England

DICTIONARIES give a confusing array of explanations of "hard" and "hardness". A "hard" material, according to the Oxford English Dictionary, is one "that does not yield to blows or pressure; not easily penetrated or separated into particles; firm and resisting to the touch . . .". "Hardness" implies "difficulty of penetration, inflexibility, rigidity, stiffness . . .".

Even the earlier scientific workers on rubber were equally vague; thus, Dawson (*1*) in 1927 regarded hardness as "an ill-defined little understood property" and considered that resistance to penetration—the practical criterion of hardness—"brings into play not merely forces associated with the surface cohesion but also more deep-seated disturbances connected with elasticity, plastic deformation (or set), internal friction, resilience and energy absorption"—truly an intractable mixture!

The practical man, disregarding theoretical difficulties, has always judged hardness by some form of indentation test, if only with the thumb-nail or a pencil point, and out of such crude beginnings have grown the precise standardized tests of today.

However, hardness testing could never have reached its present status without a fundamental understanding of the nature of the hardness of vulcanized rubber. The first important step towards this understanding was the study of the indentation of rubber by a rigid ball (*2*). This demonstrated, both theoretically and experimentally, that when a ball of given diameter under a given force penetrates an elastic isotropic material, the depth of indentation is determined solely by the elastic modulus of the material.

A word of explanation may be added here about the term "elastic modulus". The investigation just referred to was in terms of "Young's (extension) modulus for small strains", but as shear modulus is less dependent on the magnitude of the strain it may be considered preferable to Young's modulus. Since in an isotropic elastic material shear modulus is one-third of Young's modulus, provided the strain is small, it is immaterial to the present argument which is used.

The important point is that hardness is a measure of elastic modulus, or more specifically, the load required to press a ball of given diameter to a given depth into a rubber is proportional to its elastic modulus. Two important consequences follow: Firstly, it removes hardness testing from the realm of empiricism and gives it its rightful place among the quantitative measurements made on rubber; secondly, it has enabled a scientifically designed scale of hardness to be developed.

Actual rubbers are of course never perfectly elastic and isotropic. A well vulcanized "pure gum" natural rubber comes very near to this ideal, but deviations from it increase as we pass to filler-loaded and synthetic rubbers and when we consider tests at low temperatures. However, provided these "imperfections" are not lost sight of, we shall not fall into serious error.

Factors Influencing Hardness Measurements

Before discussing the development of test methods and instruments we must consider briefly certain factors that affect the result, since they have had an important influence on these developments.

Properties of the Rubber: Among the properties of the rubber, elastic modulus is of over-riding importance, as indicated above. However, all rubbers show some time dependence of deformation, resulting in creep and stress relaxation. Consequently, in an indentation test the depth of indentation increases with the period of application of the load, so that for precise measurements the period must be fixed. Experiments have shown that 30 seconds suffices to reach a reasonably constant indentation in the usual form of indentation test (*3*).

The smoothness of the rubber surface has some influence; even a fine cloth marking appreciably increases the indentation (*4*). Buffing with a fairly fine abrasive (60 to 80 mesh grit) avoids this, but the rubber must be given a rest period after buffing. Lubrication normally has little effect, but since it does tend to give more consistent readings (*5*), lubrication of the rubber surfaces with talc has been recommended as standard practice by the International Rubber Test Methods Committee ISO/T.C.45 (see Appendix, Section 3, Procedure).

Dimensions of the Rubber: Theoretically, the result of any indentation test depends on the thickness of the rubber, because indentation involves compressing it between the indentor and the underlying hard surface, and the thinner the rubber the greater is the compressive strain produced by a given indentation. The effect of varying thickness can indeed be quite serious. The way towards minimizing this undesirable feature was shown by the discovery that the effect of varying thickness is less the smaller the diameter of the indentor (ball or cylindrical plunger) (*6*). It is of course possible to correct *approximately* for variations in thickness. The British Standard hardness method includes a graph for this purpose (*7*), and similar data in tabular form have been published (*8*).

The lateral dimensions of the rubber have some effect in that a test near the edge gives a deeper indentation. This is more pronounced the thicker the rubber, and consequently the International method agreed by ISO/T.C.45 specifies a minimum distance from the edge for any given thickness (see Appendix, Table I).

Temperature and Humidity: The effects of these external variables have not been fully studied, but in so far as they affect modulus or creep they must influence the hardness reading. Consequently, control of temperature within certain limits is essential. (ISO/T.C.45 recommends a tolerance of $\pm 2°C.$, see Appendix, Section 6). Whether humidity need be controlled is still an open question. In a different sense the effect of temperature is useful because it forms the basis for using hardness tests to study cold resistance of vulcanized rubbers.

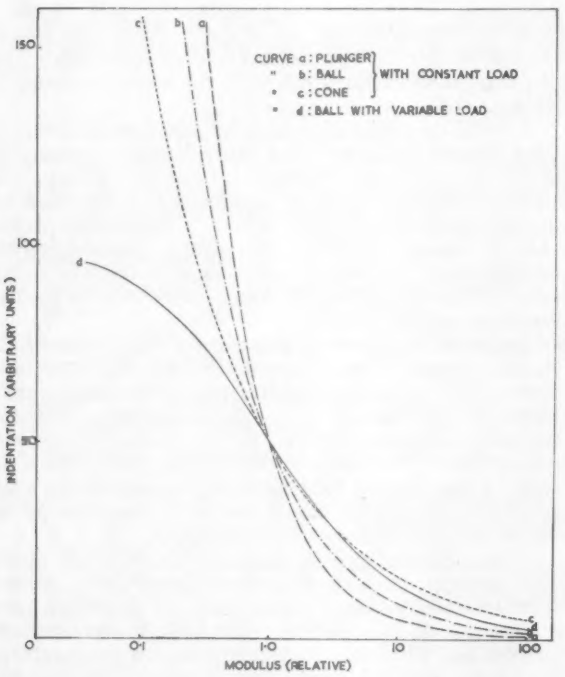


FIG. 1

Hardness Tests and Instruments: General Considerations

There is no need here to describe the many instruments devised for testing hardness of vulcanized rubber, since an excellent survey has recently been published (*9*). It will suffice to state that, with very few exceptions, all hardness instruments have used the principle of pressing a rigid indentor into the rubber. One interesting exception is the Herbert pendulum, in which the hardness of the rubber is made to influence the time of swing of a rocking pendulum (*10*); however, this has never been widely used in rubber testing. We must now consider in detail the essential factors in penetration tests.

Shape of Indentor: Indentors so far used have been spherical (or part-spherical in the form of hemispherical-ended plungers), conical, frusto-conical (as in the Shore Durometer), or flat-ended cylindrical plungers.

Two considerations, one theoretical and one practical, influence the choice of indentor shape. The theoretical consideration is the relation between the modulus of the rubber and the depth of indentation under a fixed load. It would be very convenient to have a hardness scale such that equal *proportionate* differences in modulus produce equal differences in hardness reading. Since the quantity read *directly* is usually the indentation, the ideal would thus be a linear relation between the logarithm of the modulus and the indentation. The actual relationships for the three main types of indentor are shown in curves a, b and c of Figure 1 (the frusto-conical indentor probably behaves similarly to the flat-ended cylindrical plunger).

None of the indentors comes near to the ideal linear relation, but the cone is the nearest, while the flat-ended plunger is worst, giving a very cramped scale in the high modulus region and an unduly open scale in the soft region. However, practical considerations argue strongly against any indentor with a sharp point (cone) or edge (plunger), because wear or damage of the point or edge is inevitable and influences the behavior of the indentor. It is well known that such wear occurs in the Shore Durometer and leads to incorrect readings. Ball or hemispherical-ended indentors are much less subject to this disadvantage. This, and the fact that hard steel balls of very accurate diameter as made for use in bearings are readily available, indicates the ball as the most suitable type of indentor, thus endorsing the choice already made by most national standardizing organizations.

An important detail in the design of a "ball" indentor is that it should comprise a part-sphere greater than a hemisphere, mounted on a shaft of reduced diameter—Figure 2 (a)—and not merely a cylindrical plunger with

hemispherical end—Figure 2 (b). The former shape reduces friction between rubber and indentor when the indentation is deep.

Type of Load: Instruments using spring loading are—either deliberately or owing to the unavoidable variation of spring pressure with compression—variable load instruments, i.e., the load varies with the depth of indentation. Dead load instruments give nominally a constant load, although in fact variation is often introduced by the spring in the dial measuring gauge.

A variable load has one theoretical advantage in enabling a nearer approach to the ideal linear relation between log. modulus and indentation, as referred to above. Curve d in Figure 1 shows this relation for a ball indentor with a load that varies linearly from a maximum at zero indentation to zero at a limiting maximum indentation. Although still not straight, this line comes nearer to having a uniform slope than do any of the curves (a, b, c) for indentors used with a constant load.

However, the variable load principle has practical disadvantages, especially if one adopts the obvious simple method of producing a load that varies automatically and linearly with the depth of indentation, i.e., by using a spring. To get a spring giving exactly the right load/indentation relationship, and to re-adjust it if fatigue or other cause upsets it, is far less easy than providing a dead weight for a constant load instrument. Consequently, all precision laboratory hardness gauges have adopted the dead load principle.

It is appropriate to mention here one important type of variable-load instrument, namely that developed by Buist and Kennedy (*11*), in which the load is deliberately variable so as to produce a constant indentation, the hardness being thus measured in terms of a force, not an indentation. The advantage is that the force so measured is (for an elastic isotropic material) strictly proportional to the elastic modulus, provided all rubbers tested have the same thickness, whereas the generally accepted indentation/modulus relationship is only approximate unless the rubbers tested are extremely thick. Hence, when it is desired to use hardness tests to measure modulus, this constant indentation test is preferable. It has not, however, been widely adopted for general purposes, doubtless because it is simpler to measure an indentation than to adjust and measure a force.

Zero Load and Presser Foot: All hardness tests involve an indentation, and the depth of this must be measured from some fixed zero position. This sounds quite simple, but in fact the fixing of a satisfactory zero has given more trouble than any other feature of the test. The ideal zero position would be with the indentor just touching the rubber surface. Unfortunately, with a ball indentor this proves impracticable, because to ensure contact some force must be applied to the ball, and since the contact area is extremely small, this produces an indentation that varies with the force applied. (As will be noted later, the indentation P is proportional to $F^{0.74}$, where F is the force; hence, dP/dF approaches infinity as F approaches zero.) Thus, it will be difficult to get a sufficiently reproducible zero position, and experience confirms that taking the position of first contact between ball and rubber as the zero is unsatisfactory.

Two alternative solutions of this difficulty have been devised:

ZERO LOAD: A known load (small compared with the main indenting load) is applied to the indentor and its position under this load is taken as the zero.

PRESSER FOOT: An annular foot, surrounding the indentor, rests on the rubber surface; the indentation is measured from the plane of this foot, on the assumption

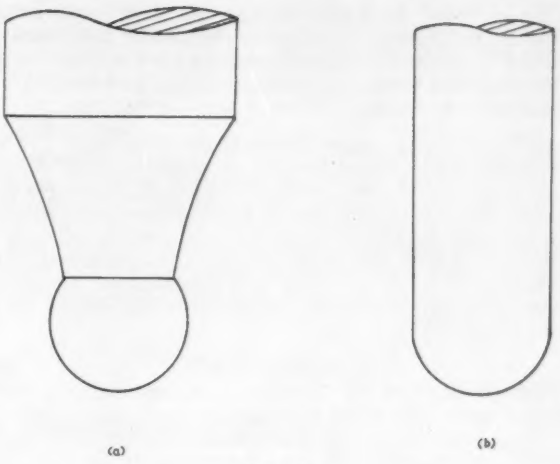


FIG. 2

(which is not necessarily true) that when the indentor is just touching the rubber its tip is in this plane.

It has been shown in a recent paper (*5*) that in practice either of these methods is liable to give inaccurate results, for reasons fully discussed therein and hence not reproduced here. This paper further shows theoretically, and confirms by experiment, that the best procedure is to use both a presser foot and a zero load, that is, indentations are measured from the flat surface of a rigid foot resting on the rubber, and the reading taken is the difference between indentations produced by a small "zero" load and a large "total" load. This is the preferred method in the British Standard (B.S. 903: 1950) and has since been adopted by the International Committee ISO/T.C.-45 (see Appendix, Section 3).

The British Standard, but not the ISO method, does permit tests without a foot, referred to as "base plate" tests, because indentations are measured relative to either the base plate that carries the test piece (e.g., Admiralty gauge) or the supporting surface—not part of the instrument—on which both instrument and test piece rest (e.g., Pusey Jones). However, this form of test is restricted to rubber articles of which the upper surface is not flat, so that a foot would not rest firmly on it.

Expression of Hardness: From almost the earliest days of hardness testing some instruments have expressed hardness directly as depth of indentation, so that "zero" hardness is in fact infinitely hard, while others have reversed the scale, taking an arbitrary 100 as dead hard, with 0 for very soft. This has led to much confusion, and after a prolonged attempt in the United Kingdom to get the former type of scale generally adopted (the "British Standard Hardness Number" of B.S. 903: 1940), it had to be realized that the practical man, especially the engineer, did not readily accept "zero" hardness as signifying infinitely hard. In the 1950 British Standard, therefore, the scale was reversed and this scale, ranging from 0 (infinitely soft) to 100 (infinitely hard), is now accepted internationally, as will be described below.

The Ball Indentation Test

We thus reach the conclusion that the best test for general purposes is that using a ball indentor, surrounded by a presser foot that forms the reference plane for indentation measurements, and in which the difference between the indentations under a small "zero" load and

a large "total" load is measured and then transformed into a value ranging between 0 (soft) and 100 (hard). It now remains to consider the details, such as size of ball, foot size and pressure, indenting loads, and method of transforming readings.

Ball Size: The first factor to be considered is the desirability of making the test as nearly as possible insensitive to variations in the thickness of rubber tested. It has been shown (*6*) that to do this the indentor should be as small as possible. However, too small a ball is undesirable for the following reason: The indentation (P) produced by a ball of radius R is related to the indenting force (F) and the Young's modulus of the rubber (M) as follows (*2*):

$$F/M = K.R^{0.05} P^{1.35} \quad (1)$$

where K is about 1.9 (a revision of the originally published value 2.1) when all quantities are in c.g.s. units.*

Equation (1) is true only when P is less than about 1.6 R, so that the ball diameter should be at least 1¼ times the deepest indentation normally encountered (*13*). At the time this matter was being considered by the British Standards Institution, hardness was expressed as a depth of indentation and it was desired that this should be the same as with a ¼-inch ball under 1 kg. load. This means having indentations up to about 1.9 mm., and hence a ball not less than about 2.4 mm. diameter.

As the A.S.T.M. had already standardized 3/32-inch (2.38 mm.), this size was adopted by the British Standards Institution. In subsequent international discussions this was changed to 2.44 ± 0.06 mm., so as to allow the standard metric 2.50 mm. ball to be used. The variation in hardness readings produced by the tolerance is of no account in view of other unavoidable sources of variation.

Indenting Loads: The larger the load the deeper the indentation and hence the more accurately it can be measured. However, if the indentation is deep it becomes more sensitive to variations in thickness of the rubber (*6*). This was another reason why the British Standards Institution, in adopting the A.S.T.M. 3/32-inch ball, did not adopt the 3 lb. (1360 gr.) load, which would have given a much deeper indentation than the test with a ¼-inch ball and 1000 gr. load. The decision to keep the same indentation as in this latter test necessitated reducing the load far below 1000 gr.

The next point was to decide on the zero load. This was again a compromise. If the zero load is too large the total indentation is increased and the test thus made more sensitive to thickness variations. If it is too small the "zero" indentation becomes very sensitive to any error or variation in the zero load (since dP/dF is high when F is small). The best compromise was decided to be about one-twentieth of the total load (*14*).

These considerations led to the choice of 30 gr. zero load and 570 gr. total load for the I.S.O. ball of 2.44 mm. diameter.

Foot Dimensions and Pressure: The deformations produced by pressing a ball into a piece of rubber are not confined to the immediate vicinity of the ball. The rubber that has been forced out of the space occupied by the indentation must go somewhere, and it is likely that this results in a slight thickening of the rubber at some distance from the indentor. If a foot is pressing on the rubber this thickening will be resisted, and this will react on the indentor in the sense of reducing the depth of indentation. This theoretical deduction is confirmed by experiments (*15*) which show that with a 3/32-inch ball the differential indentation reading (using 30 gr. and 565 gr. loads) is reduced about 7% by the use of a foot 0.8 inch diameter with central 0.2 inch hole under a pressure of 850 gr. It is thus important to standardize the dimensions and pressure, and this has been done by the International Committee ISO/T.C.45 (see Appendix, Section 2d).

Vibration and Lubrication: Most hardness instruments use a dial micrometer gauge to measure the indentation. This and other moving parts introduce the possibility of friction and, hence, inaccurate readings. Gentle vibration, e.g., by an electric buzzer, helps to overcome this and has been shown to improve the consistency of readings very considerably (*5*). Lubrication of the rubber surfaces with talc gives a further small but definite improvement. The ISO Committee therefore recommends such lubrication as well as the application of gentle vibration in all intruments where there is any possibility of friction.

Choice of Hardness Scale: In devising a hardness scale several features were held to be desirable:

(1) The scale should extend from 0 (infinitely soft) to 100 (infinitely hard).

(2) The hardness value should bear a known relation to modulus in the case of elastic isotropic materials.

(3) Over at least the central range of values one unit difference in hardness should correspond to the same proportionate difference in modulus (i.e., hardness should be a linear function of log. modulus).

(4) The scale should if possible approximate to the Shore A scale.

Fortunately, it proved possible with a little ingenuity to satisfy all these requirements reasonably well. This was achieved by using a probit (integrated Gaussian error) curve to transform log. modulus into a hardness value. The curve actually used is shown in Figure 1 of the Appendix. This has its mid-point (hardness 50 degrees) at log. M = 2.50 (M = 315 lbs./in.²) and a maximum slope (at the midpoint) of 54 degrees per 1 unit difference in log. M. For those who like precise definitions, the International Rubber Hardness Degrees (IRHD) value is the percentage frequency corresponding to a probit value equal to $(1.352 \log_{10}M + 1.620)$, where M is the Young's modulus in lbs./sq. in. of the rubber. (If shear or rigidity modulus G is used instead of M, the formula becomes $1.352 \log_{10}G + 2.097$). "Probit" is defined thus (*16*): The probit of the proportion P is the abscissa which corresponds to a probability P in a normal distribution with mean 5 and variance 1.

The I.S.O. Recommended Test

Frequent reference has been made above to the hardness test method agreed by Committee ISO/T.C.-45, Rubber, of the International Organization for Standardization (I.S.O.), which is reproduced in full in the Appendix. This incorporates the recommended test conditions described above. It was accepted as a Final Draft ISO Proposal at the 1951 (Oxford, England) meeting and slightly revised at the 1953 (Paris, France) meeting. It is important that this method should be made known and used as widely as possible so as to encourage uniformity of practice among all those concerned with hardness testing of rubber.

It has been indicated above that the International Rubber Hardness Degrees (IRHD) scale used in the ISO method was designed to agree approximately with the readings of a Shore A Durometer made strictly in accordance with the ASTM standard (*17*), i.e., having a maximum indentor protrusion of exactly 0.100 inch.

* This formula differs from that deduced by Larrick(*12*), probably because the latter measures indentation from the level of the rubber *immediately* around the indentor, whereas in the formula above it is measured from the undeformed surface and thus includes the depth of the shallow depression that surrounds the indentor.

Exact agreement is not possible over the whole range of hardness because by definition zero IRHD represents a material of zero elastic modulus, while zero Shore corresponds to a finite modulus, so that on very soft rubbers the two scales cannot agree.

Exactly how near the agreement is in the more normal hardness range depends on what is taken as the true Shore reading. The tolerances on indentor diameter and protrusion and spring calibration allowed by ASTM D676-49T together result in a variation of up to 5 degrees in the reading, and different laboratories using the same Shore instrument have been found to differ (on soft rubbers) by 2 or 3 degrees, even though each has averaged the results for several operators agreeing well among themselves. Moreover, the relation between Shore and IRHD is not the same for different polymers; thus, GR-S will generally read about 2 degrees higher on the Shore instrument than a natural rubber of the same IRHD value.

The position can best be summarized by saying that, except on very soft rubbers, the IRHD reading will generally lie within the range of Shore readings resulting from the sources of variation indicated above, but towards the upper end of this range. On very soft rubbers, the IRHD reading must be higher than Shore for the reason explained above.

APPENDIX

Final Draft I.S.O. Proposal for the Determination of Hardness

The standard hardness test is based on a measurement of the penetration of a rigid ball into the rubber test piece under specified conditions. The measured penetration is converted into International Rubber Hardness Degrees, the scale of degrees being so chosen that 0 represents a material having an elastic modulus of zero and 100 represents a material of infinite elastic modulus, and so that the following conditions are fulfilled over most of the normal range of hardnesses:

a. One International Rubber Hardness Degree always represents approximately the same proportionate difference in Young's modulus.

b. Readings in International Rubber Hardness Degrees are approximately the same as those of the Shore Durometer Type A.

For substantially elastic isotropic materials like well-vulcanized natural rubbers, the hardness in International Rubber Hardness Degrees bears a known relation to Young's modulus, although for markedly plastic or anisotropic rubbers the relationship will be less precisely known.

The hardness test consists in measuring the difference between the depths of penetration of the ball into the rubber under a small initial load and a large final load. From this difference the hardness in International Rubber Hardness Degrees is derived by using either Table II, or a graph based on this table, or a scale, reading directly in International Rubber Hardness Degrees and derived from the table, fitted to the penetration-measuring instrument.

The relation between the difference of penetration and the hardness expressed in International Rubber Hardness Degrees is based on:

(i) The known relation between penetration (P, in hundredths of a millimeter) and Young's modulus (M, in kilograms per square centimeter) for a perfectly elastic isotropic material, namely:

$$F/M = 0.00017\ R^{0.65}\ P^{1.33}$$

where F = indenting force (kg), and
R = radius of ball (cm.).

NOTE: This formula is approximate and is included as an indication.

(ii) Use of a probit (integrated normal error) curve to relate $\log_{10}M$ and the hardness in International Rubber Hardness Degrees, as shown in Figure 1, this curve being defined thus:

a. Value of $\log_{10}M$ corresponding to midpoint of curve = 2.50 (i.e. M = 315 lb./sq. in.).

b. Maximum slope = 54 International Rubber Hardness Degrees per unit increase in $\log_{10}M$.

1. *Test piece.* The test piece has its upper and lower surfaces flat, smooth, and parallel to one another; two pieces of rubber (but not more than two) may be superimposed to obtain the necessary thickness.

The standard test piece is between 8 and 10 mm. thick, the lateral dimensions being such that no test is made at a distance from the edge less than that shown in Table I.

Non-standard test pieces may be thicker or thinner than the standard, but in no case less than 2 mm. thick. The lateral dimensions are such that no test is made at a distance from the edge less than that shown in Table I.

Tests intended to be comparable must be made on test pieces of the same thickness.

2. *Apparatus.* The essential parts of the apparatus are:

a. A vertical plunger terminating in a rigid ball 2.44 ± 0.06 mm. diameter.

TABLE I

Total thickness of test piece		Minimum distance	
mm.	in.	mm.	in.
2.5	0.1	6.5	0.25
5	0.2	7.6	0.30
8	0.3	9.0	0.35
10	0.4	10.0	0.40
15	0.6	11.5	0.45
25	1.0	12.7	0.50

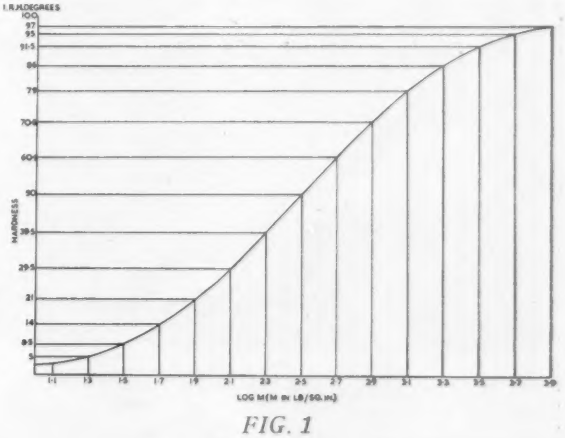


FIG. 1

b. Means for applying loads of 30 g. and 570 ± 5 g. to the ball; it is essential to allow for the weight of the plunger and any fittings attached to it and for the force of any spring acting on it, in order that the loads actually applied to the ball shall be as specified.

c. Means, e.g., a dial gauge, for indicating the movement of the plunger, either in metric or inch units or reading directly in International Rubber Hardness Degrees.

d. A foot about 20 mm. diameter normal to the axis of the plunger, and having a central hole about 5 mm. diameter for the passage of the plunger, the foot forming part of the position-measuring gauge; the foot rests on the test piece and exerts a pressure on it of 200 to 300 g/sq.cm.

e. Means, e.g., an electrically-operated buzzer, of gently vibrating the apparatus to overcome any slight friction (this can be omitted in instruments where friction is completely eliminated).

3. *Procedure.* The test piece is first conditioned. (See note.) The upper and lower surfaces of the test piece are lightly dusted with talc and the test piece supported on a horizontal rigid surface. The foot is first lowered so as to rest on the surface of the test piece. The plunger and indenting ball are pressed for five seconds vertically on to the rubber, the load on the ball being 30 g.

If the gauge is graduated directly in International Rubber Hardness Degrees the bezel of the gauge is then turned so that the pointer indicates 100 (care being taken not to exert any vertical pressure on the gauge). An additional load of 540 g. ± 5 g. is then applied and maintained for 30 seconds; the reading on the gauge is the hardness in International Rubber Hardness Degrees.

During the loading periods the apparatus is gently vibrated to overcome any friction.

If the gauge is graduated in metric or inch units the movement of the plunger (D) caused by applying the 540 g. load as described above is read off and converted into International Rubber Hardness Degrees by using Table II or a graph constructed therefrom.

4. *Number of readings.* One measurement is made at each of four or more different points distributed over the test piece and results averaged.

5. *Conditioning.* The samples are maintained at the temperature of test, and at a relative humidity still to be agreed, for at least 12 hours immediately before testing.

6. *Temperature of test.* Normally the test is carried out at 20 ± 2°C. (See note.)

7. *Expression of results.* Hardness is reported to the nearest whole number as the mean result of the four (or more) measurements expressed in International Rubber Hardness (I.R.H.) Degrees, and the following additional data quoted:

(i) Thickness of test piece.

(ii) Temperature, if other than 20 ± 2°C.

(NOTE: Details of conditioning have not yet been finalized; in particular, the standardization of test temperatures is receiving further consideration. For a progress report, see Reference No. 18.)

TABLE II

D, mm/100	International Rubber Hardness Degrees	D, mm/100	International Rubber Hardness Degrees
0	100.0	80	57.0
10	96.6	90	53.3
20	89.9	100	50.0
30	83.0	120	44.2
40	76.6	140	39.5
50	70.9	160	35.5
60	65.7	180	32.5
70	61.1	200	30.5

LITERATURE REFERENCES

(1) Dawson, T. R., *I. R. I. Trans.*, **3,** 217 (1927).
(2) Scott, J. R., *I. R. I. Trans.*, **11,** 224 (1935).
(3) Dock, E. H., *J. Rubber Research,* **13,** 19 (1944).
(4) Dock, E. H., and Scott, J. R., *J. Rubber Research,* **16,** 134 (1947).
(5) Scott, J. R., *I. R. I. Trans.*, **28,** 249 (1952).
(6) Scott, J. R., *J. Rubber Research,* **17,** 1, 9 (1948).
(7) "British Standard Methods of Testing Vulcanized Rubber," B. S. 903-1950.
(8) Anon., *India-Rubber Journal,* **105,** 59 (1943).
(9) Soden, A. L., "A Practical Manual of Rubber Hardness Testing," Maclaren & Sons, Ltd., London, England, 1951.
(10) Hills, H. W. J., and Scott, J. R., *J. Rubber Research,* **16,** 141 (1947).
(11) Buist, J. M., and Kennedy, R. L., "Facilities Available for the Physical Testing of Rubber in the Rubber Laboratories at Blackley," Bulletin, Imperial Chemical Industries, Ltd., Manchester, England. (See also Reference No. 9, p. 26).
(12) Larrick, L., *Physical Review,* **57,** 358 (1940).
(13) Scott, J. R., *J. Rubber Research,* **17,** 83 (1948).
(14) Scott, J. R., *J. Rubber Research,* **17,** 87 (1948).
(15) Soden, A. L., *J. Rubber Research,* **20,** 46 (1951).
(16) Finney, D. J., "Probit Analysis," 2nd Edition, Cambridge University Press, Cambridge, England, 1952.
(17) A. S. T. M. Designation D676-49T.
(18) Buist, J. M., *India-Rubber Journal;* **125,** 418 (1953).

Coming Next Month . . .

"Tear Resistance of Vulcanized Hevea Latex Films" by J. W. F. van't Wout and A. J. de Vries of the Rubber-Stichting —A comprehensive report on improving the tear resistance of latex films by increasing the alkalinity of the compound through the addition of potassium hydroxide or guanidine derivatives.

"Recent Developments in Motor Insulation for Rubber and Plastics Service" by William Schneider of the Westinghouse Electric Corp.—A detailed description of the development of a new insulation which is preventing service failures for all types of motor-driven apparatus utilized in rubber and plastics factories. Includes specific test results.

"Symposium on Protective Materials for Rubber Products"—A run-down of the questions and answers on antioxidants, antiozonants and waxes which featured a recent meeting of the Akron Rubber Group. Includes basic down-to-earth information.

Plus several short practical articles.

Calender Train Boosts Tire Production by 20% for Goodrich

A MAMMOTH new calender train at the Oaks, Penna., plant of the B. F. Goodrich Company Tire & Equipment Division, believed to be the only one of its type in the world, has enabled the plant to boost its tire production by 20 percent.

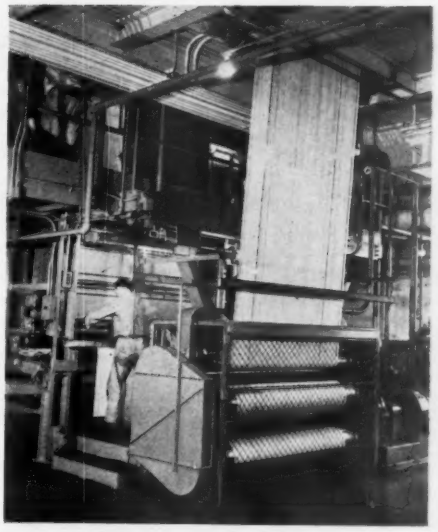
Heart of the high-speed calender train is a 30-foot-long control panel. An operator from this master control panel oversees the continuous processing of nylon tire cord from the forming of the sheet, through dipping and drying, coating both sides of the sheet with rubber, and, finally, winding of the finished stock.

The unit was designed by Goodrich engineers to incorporate the BFG nylon weftless creel process wherein nylon tire cords are coated with adhesive and rubber while a prescribed uniform tension is maintained on each cord. The net result is a cooler running tire that provides maximum safety at high speeds.

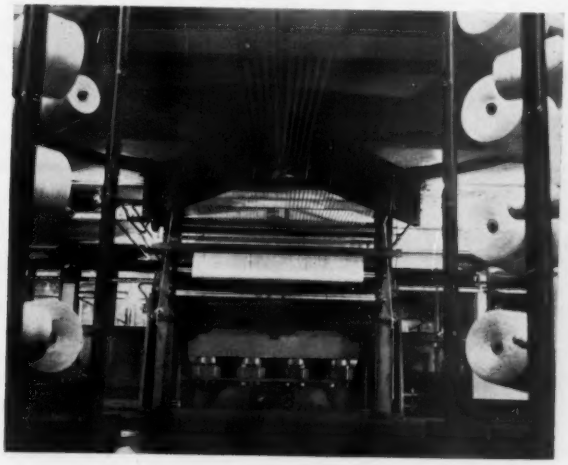
Longer than a football field and taller than a three-story house, the "big train" starts its run with 2500 strands of nylon cord manufactured at BFG's textile plant in Silvertown, Georgia. The cord is passed through an adhesive dip and an air dryer section where the cord is treated at high temperatures under controlled tension. It is next passed through a four-roll calender where both sides are laminated with rubber while still in weftless form. The material completes its run by being treated with adhesive cement and wound in rolls for the fabric preparation section.

In case of trouble, automatic devices shut down the entire calender train while one or more of a bank of 40 annunciator lights on the control panel indicate the source of trouble. There are 60 control or indicating devices while 40 measuring and recording units on the control panel record progress of the entire operation.

Communications between the master control operator and the calender crew are maintained through a private telephone exchange with 32 outlets. The system also has a public address set-up. One safety device continuously samples the air for hazardous mixtures in the cement dip enclosure while another mechanical watchdog operates a carbon dioxide fire extinguishing system.



A 66-inch wide web of nylon tire cord is shown entering the calender train at the tensioning rolls prior to dip immersion. This is the beginning of the calendering process in the new calender train at the Oaks plant.



Some 2500 ends of nylon tire cord are gathered together in this eyelet board to form a complete web, approximately 66 inches wide.

This wind-up section is the end of the line for nylon tire cord which has been processed through the huge new calender train.

The Oaks calender train thus accomplishes the ultimate in continuous processing of nylon tire cord with modern nylon tire cord adhesives, a process used by BFG for more than seven years. Built at a cost of some $2,000,000, the mammoth train occupies nearly the entire space of an area 380 feet long, 34 feet high, and 60 feet wide.

Set-stretched nylon tire cord turned out by the train is used by Goodrich in the manufacture of truck, bus, off-the-road, airplane, and passenger car tires, including an all-nylon tubeless tire. Set-stretched nylon tire cord is also used in the exclusive "shock-shield" built into all BFG heavy-duty truck tires. The "shock-shield" is an extra layer of rubber-covered nylon cords placed between the tread and plies of a tire. The nylon cords run parallel to each other and flex in unison to guard against any of the sharp impacts that cause bruises and breaks.

Quad-Rings Replace Regular O-Rings in Piston Mechanism

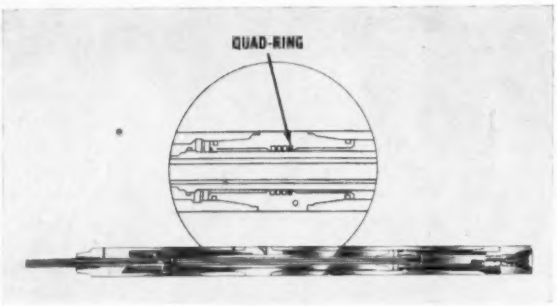
PERFORMANCE tests on Quad-rings, a new type of industrial seal, are proving their superiority to other seals in numerous applications, according to officials of the Minnesota Rubber and Gasket Co., Minneapolis 16, Minn. The company claims to be the nation's largest producer of O-rings and to have originated the injection molding rubber process for such rings.

The Houston Oil Field Material Co., Houston, Texas, were experiencing difficulty when O-rings were used in the piston mechanism for their nitrogen-powered impact tool. This tool ranges from 10 to 20 feet in length and was used to search out and remove broken drill stems and tools in well casings, either by driving a collar around the stem for removal or by pulverizing it.

Pressures ranged from 0 to 4,000 psi differential. When nitrogen gas was released into a chamber at the top of the tool, the piston was driven down. Slowing and braking of the thrust was controlled by the viscosity of silicone grease in a chamber at the lower end.

Two O-rings and back-up rings were used in the packing gland. In operation, it was found that leather back-up rings were charred by friction and spiral Teflon rings extruded too much to be effective. Successful operation of the tool depended on containing an exact amount of silicone grease; loss of ½ cup of grease resulted in an inoperative tool, and they were unable to contain the grease with O-rings for as long as eight hours, the usual work period. If a seal failed, it required from 4 to 8 hours to extract the tool from the well casing, which sometimes ran as deep as 8000 feet, and replace the seal.

As the grooves were very close together, two Quad-rings were tried in each groove, and the piston slid for two feet through the four Quad-rings. The piston had 15 to 25 micro-inch finish and was chrome-plated; the packing gland had a 63 micro-inch finish. When tested over a period of six months, they performed satisfactorily without any replacement and have been in operation ever since.



Operation of Quad-rings in piston mechanism.

Field tests and production performances of the Quad-ring have shown no parting line on sealing edges, no torque leakage at low pressure differentials, no spiral twist failures and no rolling with pulsating pressure.

Based on this type of field test and other operating experience the Quad-ring is a successful rotary seal and also acts as a dust seal. It provides a perfect seal for static installations, the manufacturer states, especially for low pressures down to 0 as well as extremely high pressures and vacuum. The company attributes the ring's longer life to reduced squeeze required for a perfect seal, which also reduces break-away and drag resistance, and claims economy through longer life, lower installation cost and because extra fine finish and close tolerances are not necessary.

Conveyor Belt Cuts Railroad Material Handling Costs

THE first known application by a U. S. railroad of a rubber conveyor belt for classifying track material for re-use, reclamation, or scrap, has cut costs at the Roanoke Maintenance of Way Yard at the Norfolk and Western Railway Company.

The entire materials handling system begins when a crane, equipped with an electro-magnet, lifts the track material from railroad cars to a flat receiving plate. Workmen rake the material from the plate onto the belt. The loaded belt passes by a series of 21 bins. At each bin is a workman who tosses into the bin whatever material is to be classified, such as rail joints, tie plates, rail anchors, switch stands, etc. By the time the material has traversed the length of the conveyor, only unsalvageable scrap is left.

Equipped with a 24-in-wide, 4-ply belt manufactured by the Quaker Rubber Division of H. K. Porter, Inc., Philadelphia, Penna., the conveyor system is 700 feet long. Its advantages include doubling the speed of classifying track materials, easier sorting of material, quicker release of freight cars carrying the material into the yard, and greater safety.

Tensile Strength Testing of Spray-Formed and Cast Vinyl Films

Part II—The Effect of Some Variables

By L. BERGER*, I. WEBER† and A. GALLACCIO

Ordnance Corps, Frankford Arsenal, Philadelphia 37, Penna.

Some factors affecting tensile strength values of specimens of spray-formed and cast vinyl films, suggested by work reported in Part I of this study, have been investigated.

Different operators, day of preparation, aging time, and a minor change in formula are shown to have significant effects. Reproducibility of trends of tensile strength with short term room temperature aging is not apparent.

Spray-formed and cast films showed significant variations due to day-to-day preparative technique. Modification of the sampling technique developed in Part I resulted in reproducible averages for each operator. Variations between operators were still significant. Further modification of the sampling technique to include specimens obtained from three films, each prepared on different days and by different operators, resulted in reproducible mean tensile values.

Film thickness was found to be linearly correlated with tensile strength when films of different thicknesses were cast the same day; when films of each thickness were cast on different days, there was no apparent trend. Thicker films gave lower tensile strength values.

The lower side of die-cut tensile specimens is narrower than the upper side. The relationship between average width and thickness of specimens was found to be linear, with thicker films producing specimens of narrower average width. The width of the tensile specimen should not be assumed equal to the width of the die. Such an assumption may introduce a significant error in tensile strength measurements.

Calculation of tensile strength values using the measured average width of specimens does not account for all of the reduction in tensile values with increased film thickness.

IN Part I of this study (*1*) the reproducibility of tensile strength results of spray-formed and cast vinyl tensile specimens was investigated. It was shown that the reproducibility was poor in all cases, but that the dispersion of values within each type of film was the same. In both types of film the between film error was found to be larger than the within film error; proper sampling was shown to compensate for this condition.

A major cause of the variation of the tensile values of spray-formed films was assigned to variations in density resulting from different spray techniques. Attempts to correlate the density of a film to its tensile strength indicated curvilinear correlation, which was of little practical value. The tensile strength was correlated with tensile index, and a relationship was derived.

As a result of the initial findings, it became important to learn whether the sampling technique recommended in Part I, that of randomly selecting five specimens from each of three films, would result in reproducible tensile results if the films were prepared by different operators. (In the initial experiments, one operator prepared all of the films.) It was essential to learn the effects of film thickness, drying time (conditioning and room temperature aging), formulation, and the day-to-day variations of the film preparation techniques of the operators. In the course of these investigations the influence of thickness on the average width of die-cut tensile specimens was examined, and the effect of width variations on tensile strength was found worthy of evaluation.

This report attempts to reveal the influences of these factors on procedures and results of tensile strength testing of vinyl films.

*Present address: Better Finishes and Coatings, Inc., Newark, N. J.
†Present address: Everite Machine Products Co., Philadelphia, Pa.

The spraying and casting techniques, and the subsequent conditioning and testing of the vinyl films from which the data for this report were obtained, are essentially the same as described in Part I. Only when the preparative, conditioning, or testing procedures are varied or have some special significance will details be given herein.

Discussions, Results and Analyses

Effect of Operator, Aging Time and Formulation: The films used in this investigation were secured from two formulations prepared at this laboratory. The formulations are hereinafter referred to as Solutions 2 and 29, and are listed in Table I.

From each of Solutions 2 and 29, three operators, A, B and C, each sprayed three films (15 in. x 24 in. x approximately 0.035 in.). The films were all prepared the same day, and sprayed with gun settings as constant as possible. A "very wet" spray technique was used. A "very wet" spray is one that results in a film which initially

TABLE I—VINYL FORMULATIONS

	Solution 2 (%)	Solution 29 (%)
VYNS [a]	15.0	15.6
DOP [b]	6.0	6.2
Rustoil [c]	3.7	—
Methyl Ethyl Ketone	75.3	78.2

(a) 90/10 Vinyl chloride-vinyl acetate copolymer. (b) Dioctyl phthalate. (c) Low temperature lubricating oil, Spec. AN-O-6A.

TABLE II—DATA FROM TIME, OPERATOR, AND FORMULATION EXPERIMENT

Time (Days) of room temperature aging.....		0	7	14	21	28	35
Operator A	Avg. Tensile Strength, psi [a]	1701	1731	1566	1696	1789	1838
	Standard Deviation [b]..	88.5	124.2	97.0	122.1	82.8	130.0
Operator B	Avg. Tensile Strength, psi	1666	1503	1378	1536	1572	1498
	Standard Deviation...	76.5	44.5	34.5	60.2	56.5	99.3
Operator C	Avg. Tensile Strength, psi	1479	1378	1295	1389	1431	1354
	Standard Deviation...	123.5	97.8	119.7	131.4	127.1	146.0
Operator A	Avg. Tensile Strength, psi	1713	1891	1915	1950	2065	2136
	Standard Deviation...	100.4	57.0	76.1	109.2	114.1	120.5
Operator B	Avg. Tensile Strength, psi	1726	1779	1684	1645	1712	1722
	Standard Deviation...	101.5	89.2	75.0	114.4	128.1	105.2
Operator C	Avg. Tensile Strength, psi	1419	1572	1441	1535	1511	1498
	Standard Deviation...	187.5	132.9	141.9	127.2	105.9	167.0

(a) Figures are means of 15 measurements in all cases. (b) Standard deviation of individual readings.

contains high solvent content, and which allows the film to flow giving a smooth surface. The film must not be wet enough, however, to allow running or sagging.

Immediately after conditioning, specimens were taken from the three films of each formulation prepared by each operator, and were tested in the following manner:

1. Thirty dumbbell shaped specimens were cut from each film;

2. Five specimens were selected at random from each of the three films, a total of 15 specimens per set (the sampling technique developed in Part I of this report);

3. The average ultimate tensile strength of the 15 specimens was determined after 24 hours' conditioning at 70° F. and 50% relative humidity;

4. The remaining specimens were spread on kraft paper and exposed at room temperature;

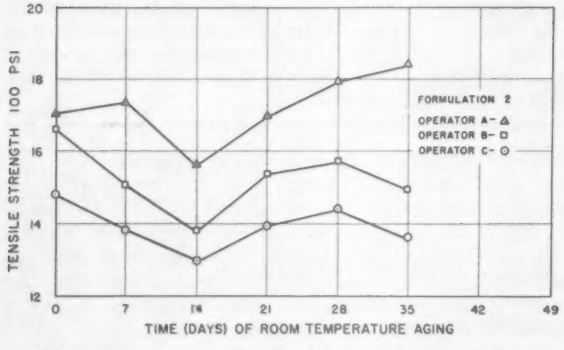


FIG. 1—Tensile strength versus time of aging—Solution 2.

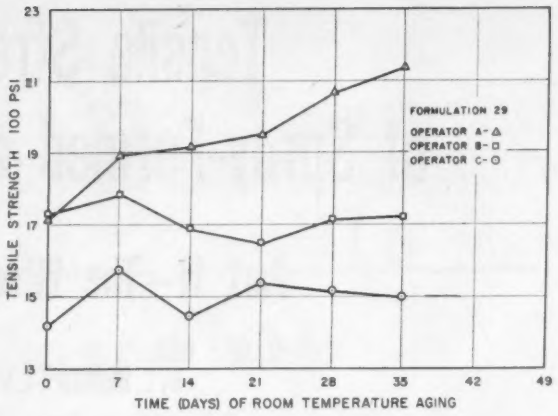


FIG. 2—Tensile strength versus time of aging—Solution 29.

5. At seven-day intervals steps 3 and 4 were repeated, for a total of five repetitions over a 35-day period.

The data are listed in Table II, and plotted in Figures 1 and 2.

As may be seen in Figures 1 and 2, the effects of formulation, operator, and time on the tensile strength of spray-formed films are considerable and appear somewhat erratic. The significance of the effect of each variable, and their interaction effects, was determined by an analysis of variance, the results of which are found in Table III.

The magnitude of the F values in Table III gives clear evidence that differences occur due to the operators, as well as formulation and time of aging. The significance of the triple interaction effect (xyz) is usually indicative of an undefined variable. It is possible that this is due to differences in standard deviations between operators. Although no comparison of the variances of Operators A, B and C was made, it appears likely that the values of Operator B are significantly less than those of Operators A and C for Solution 2. It is interesting to note in Figures 1 and 2 that with the two different formulations the relative positions of the tensile values for each operator are about the same. The inference might be drawn that operators tend to develop individual characteristic spray techniques. Operator A was an experienced operator who prepared the films used in Part I of this report; Operators B and C were inexperienced. The values of each operator are quite divergent.

TABLE III—ANALYSIS OF VARIANCE—FORMULATION, OPERATOR, AND TIME

(x = Time y = Formulation z = Operator)

Source	Degrees of Freedom	Sum of Squares	Variance	F [a]
Total	539	27,991,845	——	——
x	5	1,058,233	211,647	17.20
y	1	4,044,741	4,044,741	328.90
z	2	13,784,781	6,892,390	560.40
xy	5	923,803	184,761	15.00
xz	10	1,376,555	137,656	11.20
yz	2	316,545	158,272	12.90
xyz	10	288,816	28,882	2.35
Within Group Error.	504	6,198,371	12,298	——

(a) All F values indicate a significant effect.

TABLE IV—VOLUME OF SOLUTION AND RESULTING THICKNESS OF CAST FILMS—GROUP A

Avg. Thickness	cc Used
0.0151	220
0.0196	290
0.0241	360
0.0295	430
0.0336	500
0.0371	570
0.0430	640
0.0501	720
0.0547	790

The significant difference in the values of each formulation is not unexpected. The oil formulation was included to see what the effect of the oil, which subsequently exudes from the film, would be on the tensile strength over a short period of room temperature aging. It is reasonable to suppose that the oil carries with it a portion of the plasticizer when exuding from the film, although the data obtained do not necessarily support or refute this supposition. Using the oil solution (*2*), the trends of the tensile strength values versus time of each operator are similar, although no explanation can be given as to the cause of the particular shape of the plots. The trends of the tensile values with time using the oil-free solution (*29*) varied between operators. The values of Operator A apparently increased with time, whereas those of Operators B and C were essentially unchanged. The causes of the differences in trends are not apparent.

Effect of Specimen Thickness on Tensile Strength: Three films of each of nine different thicknesses were cast from a five-gallon batch of Solution 2, each thickness being cast on Monday of nine successive weeks. The volumes of solution used and the resulting film thicknesses are listed in Table IV.

The films were room temperature dried for 48 hours, oven dried at 60° C. for 24 hours, and conditioned for 24 hours at 70° F., 50% RH prior to tensile testing on the Friday of the week they were cast. The average ultimate tensile strength of each set of thicknesses was determined using the previously developed sampling technique. The data are listed in Table V, and plotted in Figure 3 as Group A. An F test (Table VI) showed a significant difference existed between average tensile strengths of each thickness; however, no uniform trends are apparent.

To ascertain that the lack of correlation was not an erratic occurrence, a second set of eight different thicknesses was prepared in the same manner. The data are listed in Table V and plotted in Figure 3 as Group B. The same lack of correlation was obtained with Group B as with Group A.

TABLE V—THICKNESS VERSUS TENSILE STRENGTH

Group A			Group B		
Thickness (in.)	Tensile Strength (psi)	Std. Dev.	Thickness (in.)	Tensile Strength (psi)	Std. Dev.
0.0151	1746	143.5	0.0148	2019	81.8
0.0196	1888	115.3	0.0203	2166	92.9
0.0241	2010	85.4	0.0245	2168	77.8
0.0295	1919	78.5	0.0297	2049	71.8
0.0336	1916	68.7	0.0325	2143	98.6
0.0371	1926	70.9	0.0389	2261	146.0
0.0430	1963	91.6	0.0456	2050	65.2
0.0501	1830	38.6	0.0524	2100	63.2
0.0547	1844	47.3	—	—	—

Inasmuch as the cast films prepared for this and for previous investigations are not perfectly smooth, but more or less rippled, it was felt that the ripples might be indicative of strains or other effects. The amount and pattern of the surface ripples have been observed to differ at different times of casting. In order to minimize the effect of any variable induced during casting, a third set of films was cast from Solution 2 (Group C), but instead of casting one set of films of a given thickness each week, one film of each of six different thicknesses was cast. This was repeated twice, yielding three films of each thickness. (The casting of more than six films at a time was not possible due to limited facilities.) Each set was cast on a Monday, allowed to dry for 48 hours at room temperature, and then conditioned at 60° C. for 24 hours. Five tensile specimens were cut from each film, conditioned for 24 hours at 70° F. and 50% RH, and the average ultimate tensile strength determined for each thickness. The sets of averages thus obtained for the three weeks were designated as 24-hour conditioned sets 1, 2 and 3, and are listed in Table VII and plotted in Figure 4a.

Regressions for the data of each of the 24-hour aged sets 1, 2 and 3 were calculated and compared. The relationship of thickness to tensile strength was found to be linear for practical considerations within the values tested. A comparison of the week-to-week regressions indicated a significant difference in the means, but essentially similar slopes. The average regression was found to be $\bar{Y} = -6104X + 2215$.

A second group of specimens was cut from the same sets of films after an additional 24 hours of conditioning at 60° C. The data are listed in Table VII and plotted

TABLE VI—F TEST, VARIATION OF TENSILE STRENGTH WITH THICKNESS

Source of Error	Degrees of Freedom	Sum of Squares	Mean Square	F
Total	134	1,703,510	—	—
Between thicknesses	8	734,941	91,868	11.95
Within thicknesses	126	968,569	7,687	—

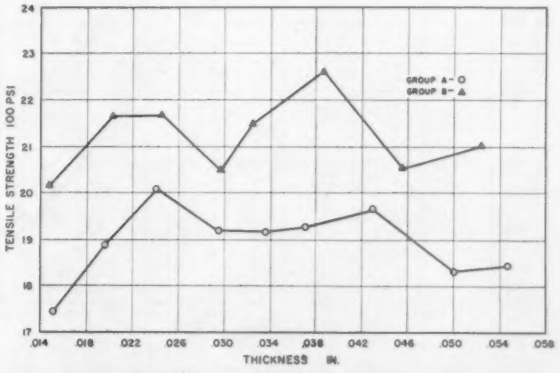


FIG. 3—Thickness versus tensile strength.

TABLE VII—TENSILE STRENGTH VERSUS THICKNESS

Group C

Week 1		Week 2		Week 3	
Avg. Thickness (in.)	Avg. Tensile Strength (psi)	Avg. Thickness (in.)	Avg. Tensile Strength (psi)	Avg. Thickness (in.)	Avg. Tensile Strength (psi)
		24-Hour Conditioned			
0.0100	2073	0.0110	2148	0.0100	2158
0.0197	2078	0.0200	2131	0.0200	2156
0.0288	1984	0.0290	2038	0.0287	2089
0.0407	1915	0.0397	1982	0.0398	2024
0.0508	1845	0.0514	1938	0.0518	1953
0.0624	1769	0.0638	1832	0.0640	1836
		48-Hour Conditioned			
0.0098	2116	0.0104	2322	0.0098	2144
0.0199	2109	0.0200	2132	0.0198	2122
0.0293	1999	0.0294	2095	0.0287	2012
0.0404	1983	0.0398	2066	0.0394	1896
0.0509	1935	0.0518	2045	0.0515	1921
0.0627	1875	0.0636	1940	0.0636	1885

Note: Each thickness and tensile value represents mean of five specimens.

in Figure 4b, and are designated as 48-hour conditioned sets 1, 2 and 3. A comparison of week-to-week regressions showed, as in the previous case, significantly different means, but essentially similar slopes. The average regression was found to be $Y = -5253X + 2220$.

The absence of a significant difference between slopes is again indicated by a comparison of the average 24- to 48-hour regressions, and again there is reason to believe that a significant difference exists between the means. Analysis of the data indicated that the effect of thickness does not explain the difference of the mean tensile values from week to week. The exact nature of the week-to-week variation is not known, although a contributory factor

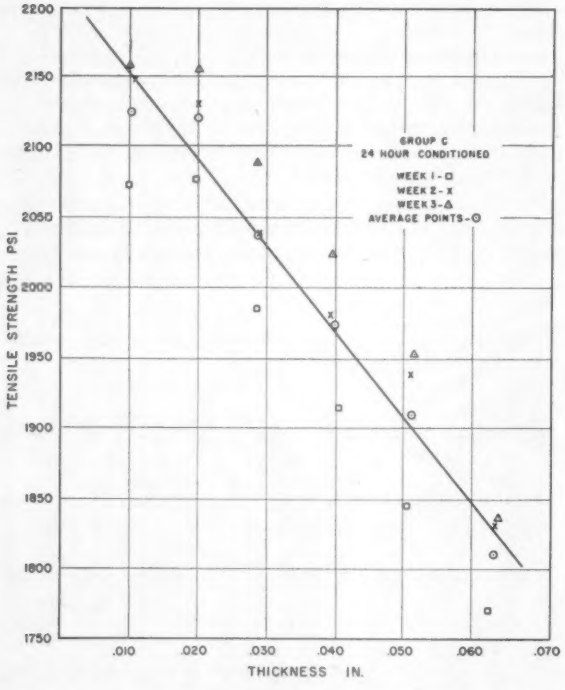


FIG. 4a—Tensile strength versus thickness—24-hour conditioned sets.

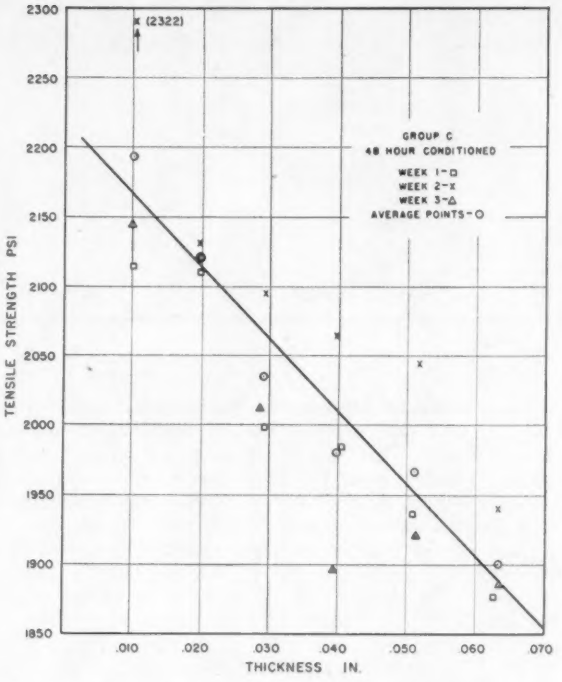


FIG. 4b—Tensile strength versus thickness—48-hour conditioned sets.

may be the uncontrollable variations in drying rates due to variation in atmospheric conditions. The possible difference in means caused by the additional 24 hours' conditioning might be anticipated from theoretical considerations. Plasticizer loss occurs during heat aging, and since reduction of plasticizer content tends to increase the tensile strength of a film, increased tensile values after short time heat aging are to be expected. A more positive difference should be observed with an increase in heat aging time.

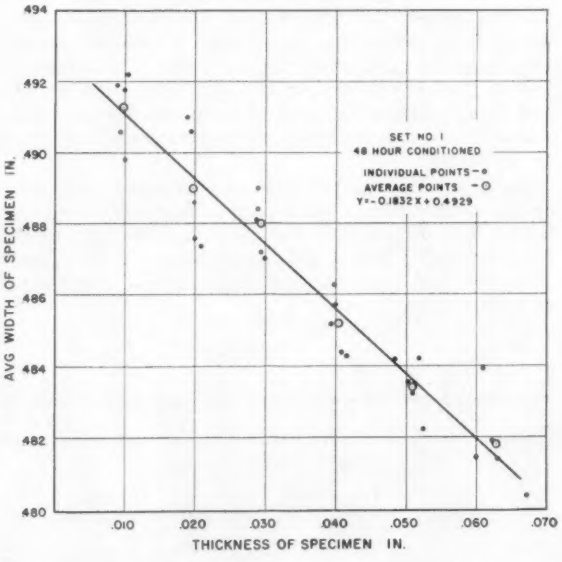


FIG. 5—Average width versus specimen thickness Set No. 1.

TABLE VIII—DATA FROM SPECIMEN THICKNESS VERSUS WIDTH EXPERIMENT

Film No. / Specimen No.	1		2		3		4		5		6	
	Thickness	Width	Thickness	Width	Thickness	Width	Thickness	Width	Thickness	Width	Thickness	Width
					Set No. 1—48-Hour Conditioned							
1	0.0100	0.4918	0.0210	0.4874	0.0300	0.4870	0.0415	0.4843	0.0520	0.4842	0.0670	0.4803
2	0.0105	0.4922	0.0200	0.4886	0.0295	0.4872	0.0400	0.4863	0.0505	0.4835	0.0625	0.4818
3	0.0095	0.4906	0.0200	0.4876	0.0290	0.4882	0.0395	0.4852	0.0485	0.4842	0.0600	0.4814
4	0.0100	0.4898	0.0195	0.4906	0.0290	0.4890	0.0400	0.4857	0.0510	0.4832	0.0610	0.4839
5	0.0090	0.4919	0.0190	0.4910	0.0290	0.4884	0.0410	0.4844	0.0525	0.4822	0.0630	0.4813
Average	0.0098	0.4913	0.0199	0.4890	0.0293	0.4880	0.0404	0.4852	0.0509	0.4834	0.0627	0.4818
					Set No. 2—48-Hour Conditioned							
1	0.0090	0.4929	0.0195	0.4902	0.0310	0.4892	0.0415	0.4875	0.0565	0.4860	0.0650	0.4822
2	0.0105	0.4928	0.0195	0.4909	0.0295	0.4915	0.0395	0.4846	0.0515	0.4862	0.0625	0.4817
3	0.0105	0.4927	0.0195	0.4899	0.0285	0.4901	0.0390	0.4835	0.0500	0.4872	0.0615	0.4835
4	0.0110	0.4925	0.0205	0.4888	0.0290	0.4882	0.0395	0.4856	0.0500	0.4838	0.0635	0.4819
5	0.0110	0.4910	0.0210	0.4894	0.0290	0.4870	0.0395	0.4838	0.0510	0.4826	0.0655	0.4819
Average	0.0104	0.4924	0.0200	0.4898	0.0294	0.4892	0.0398	0.4850	0.0518	0.4852	0.0636	0.4822
					Set No. 3—24-Hour Conditioned							
1	0.0095	0.4945	0.0190	0.4884	0.0290	0.4875	0.0400	0.4863	0.0520	0.4827	0.0660	0.4801
2	0.0105	0.4921	0.0195	0.4872	0.0285	0.4876	0.0385	0.4848	0.0505	0.4836	0.0630	0.4803
3	0.0105	0.4910	0.0195	0.4910	0.0280	0.4866	0.0390	0.4868	0.0495	0.4819	0.0605	0.4816
4	0.0095	0.4895	0.0205	0.4868	0.0285	0.4866	0.0390	0.4848	0.0515	0.4827	0.0635	0.4807
5	0.0100	0.4896	0.0215	0.4886	0.0295	0.4882	0.0425	0.4830	0.0555	0.4834	0.0670	0.4810
Average	0.0100	0.4913	0.0200	0.4884	0.0287	0.4873	0.0398	0.4851	0.0518	0.4829	0.0640	0.4808

Effect of Thickness on Specimen Cross-Sectional Area: Prior to testing the specimens of Group C, measurements were made of the widths of the upper and lower surfaces of all the specimens in two sets of each of the 24- and 48-hour conditioned specimens. An average width was determined for each specimen. The upper surface was that surface of the film which was exposed in the casting tray, and which was also the upper surface when the tensile specimens were cut out. The specimen widths were determined with a measuring microscope. The measurements of one 24-hour set were subsequently rejected because of an error in measuring technique. The specimens could not be remeasured since they had been tested immediately after the measurements were taken. The data are listed in Table VIII. Plots of the average width versus thickness of each set are found in Figures 5, 6 and 7.

The effect of thickness on the average widths of the specimens in the test area is considerable. The relationship between the thickness and average width of the specimens was accepted as linear, and the regression equations for the three sets of data were found to be:

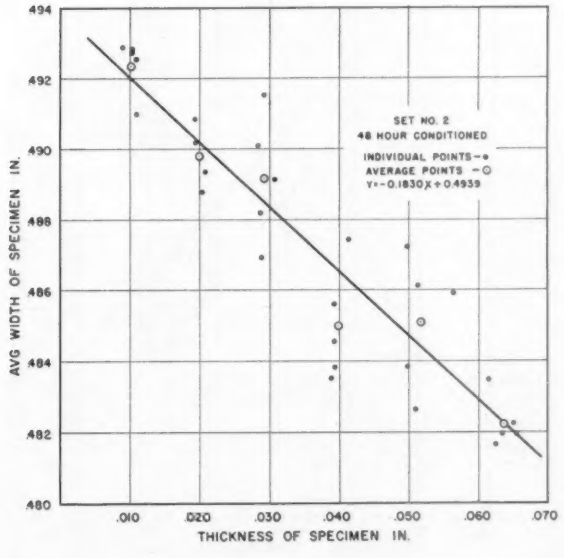


FIG. 6—Average width versus specimen thickness Set No. 2.

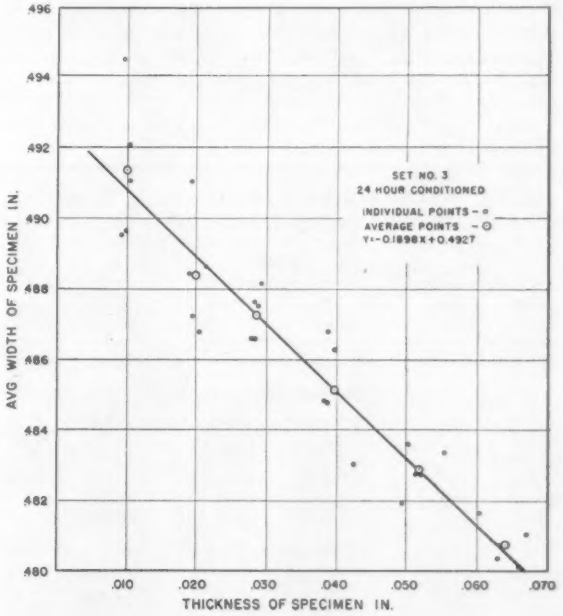


FIG. 7—Average width versus specimen thickness Set No. 3.

FIG. 8—Edge bevel of specimen. (Mag. 4.5X).

$$Y = -0.1832X + 0.4929$$
$$Y = -0.1830X + 0.4939$$
$$Y = -0.1898X + 0.4927$$

Inasmuch as the equations are not statistically different, they were averaged. The average regression was found to be:

$$Y = -0.1853X + 0.4932$$

Since the average width of the specimen was calculated as half the sum of the widths of the upper and lower faces, the relationship derived is not quite true. The so-called average width is actually an arbitrary value inasmuch as the sides of the specimen from the upper to the lower faces are not straight, but generally somewhat curved. A macrograph of a cross-section of a specimen is shown in Figure 8. The particular specimen used does not show any noticeable curvature of the sides, but it should be viewed qualitatively rather than quantitatively.

The shapes of the edges, which have been observed from time to time, often differ considerably from those shown in Figure 8. Edge bevel may be affected by the hardness of the material, the sharpness of the die, the manner in which the die is struck, and the thickness of the specimen. The data and relationships presented in this report are therefore not offered as a reproducible correction to be applied to tensile strength determinations. It is only intended to show that the variations of the width of the specimen with thickness does introduce appreciable error, and that the width of the specimen should not be assumed equal to that of the die.

TABLE IX—TENSILE STRENGTH VERSUS THICKNESS EXPERIMENT CORRECTED FOR SPECIMEN WIDTH

Group C

Week 1		Week 2		Week 3	
Avg. Thickness (in.)	Avg. Tensile Strength (psi)	Avg. Thickness (in.)	Avg. Tensile Strength (psi)	Avg. Thickness (in.)	Avg. Tensile Strength (psi)
		24-Hour Conditioned			
0.0100	2102	0.0110	2186	0.0100	2156
0.0197	2120	0.0200	2181	0.0200	2207
0.0288	2032	0.0290	2089	0.0287	2139
0.0407	1971	0.0397	2040	0.0398	2061
0.0508	1905	0.0514	2005	0.0518	2021
0.0624	1837	0.0638	1901	0.0640	1907
		48-Hour Conditioned			
0.0098	2153	0.0104	2354	0.0098	2181
0.0199	2156	0.0200	2202	0.0198	2210
0.0293	2050	0.0294	2147	0.0287	2063
0.0404	2043	0.0398	2130	0.0394	1953
0.0509	1997	0.0518	2115	0.0515	1987
0.0627	1946	0.0636	2016	0.0636	1958

TABLE X—EFFECT OF CORRECTION FOR SPECIMEN WIDTH ON THE PER CENT ERROR OF THE TENSILE STRENGTH DETERMINATION

Uncorrected			Corrected		
Tensile Strength (psi)	Std. Dev.	Per Cent Error	Tensile Strength (psi)	Std. Dev.	Per Cent Error
2126	97.5	4.6	2148	94.7	4.4
2122	51.9	2.5	2169	57.0	2.6
2037	67.1	3.3	2087	68.3	3.3
1974	66.4	3.4	2024	59.3	2.9
1912	56.1	2.9	1977	59.5	3.0
1812	48.6	2.7	1882	50.6	2.7
Average = 3.23			Average = 3.15		

Note: "t" Test of average per cent error for uncorrected and corrected tensile values = 0.14 for 10 degrees of freedom. There is no significant difference.

R. G. Newton *(2)* suggested that measurement of the actual width of a specimen, rather than assuming the specimen width constant, is not worth the effort and is an actual disadvantage. In the report by Newton, the tensile values were apparently calculated from the actual measured specimen widths. In this report, the measured widths were used to obtain a regression from which the average width of a specimen was estimated. Unless a sufficient number of measurements are made on each specimen, the use of a measured width directly does not take into account the variation of widths within each specimen. As may be seen in Table X, correction for width of the 24-hour conditioned specimens caused no significant change in the per cent error of the tensile strength determinations. Newton reported an increase in the per cent error as a result of such correction.

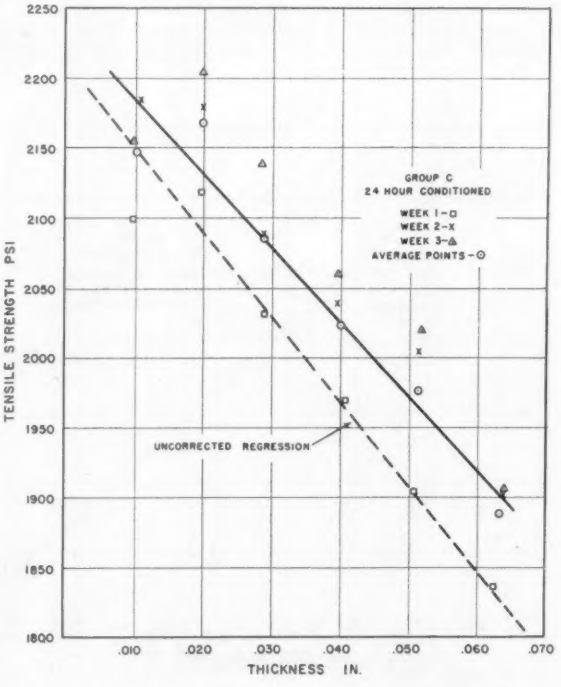


FIG. 9—Corrected tensile strength versus thickness —24-hour conditioned sets.

Davis and Horrobin *(3)*, in a discussion of the effects of knife blunting on tensile strength values, indicate that week-to-week differences may be due to resulting differences in specimen width caused by knife blunting. The general practice of assuming the specimen width equal to that of the die may explain part of the large variation of results obtained by different rubber testing laboratories in a survey conducted by the Edgewood Arsenal *(4)*.

Using the calculated relationship of average specimen width to thickness, new tensile strength values were calculated for the specimens of Group C. The new values were designated as the corrected tensile strengths, and were determined for both the 24- and 48-hour conditioned sets. The data are listed in Table IX and plotted in Figures 9 and 10. A comparison of the 24-hour conditioned corrected and uncorrected tensile values indicated a significant difference ($F = 47.4$ for 1 and 140 degrees of freedom). The data were fitted to linear regressions, and found to be:

$Y = -5324X + 2238$ for the 24-hour conditioned specimens,
$Y = -4736X + 2265$ for the 48-hour conditioned specimens,
where X is thickness and Y is tensile strength.

Analysis of covariance in the same manner as was done for the uncorrected 24- and 48-hour conditioned sets indicated no significant difference between the slopes of the corrected 24- and 48-hour conditioned values, but there is indication of a difference between the means ($t = 2.27$ for 32 degrees of freedom).

The inference to be drawn is that the rate of change of tensile strength with thickness is constant, regardless of the additional 24 hours' conditioning of the film. In general, however, 48-hour conditioned films have higher tensile strengths than 24-hour conditioned films.

Effect of Operator and Day of Film Preparation on Tensile Strength Variations of Spray-Formed Films: In the investigation of time, operator and formulation, all the films were spray-formed on the same day. Inasmuch as it has been found that day-to-day variations in casting technique are significant, it was desired to determine the effect of spray-forming the required three films on the same and different days. The spray-formed films used in Part I were prepared over several days. The effects of day-to-day variations, however, should have no bearing on the trends of the results noted as being due to time of aging or formulation.

From a five-gallon batch of Solution 29, three Operators, A, B and C, each sprayed three films on each of three different days, a total of nine films each. The films were all prepared using a very wet spray. The atomizing pressure was constant in all cases (50 psi), but the feed pressure had to be varied slightly from operator to operator in order to compensate for differences in overshooting, gun speed across plate, overlapping, etc. The films were conditioned and tested as previously described. The data are listed in Table XI.

An analysis of variance, found in Table XII, showed that the effects of the day-to-day variations, operators, and day-to-day operator interaction are significant. The "Between" error was obtained by determining variations of means of A_1, A_2, A_3, B_1, B_2, B_3, C_1, C_2, and C_3. The

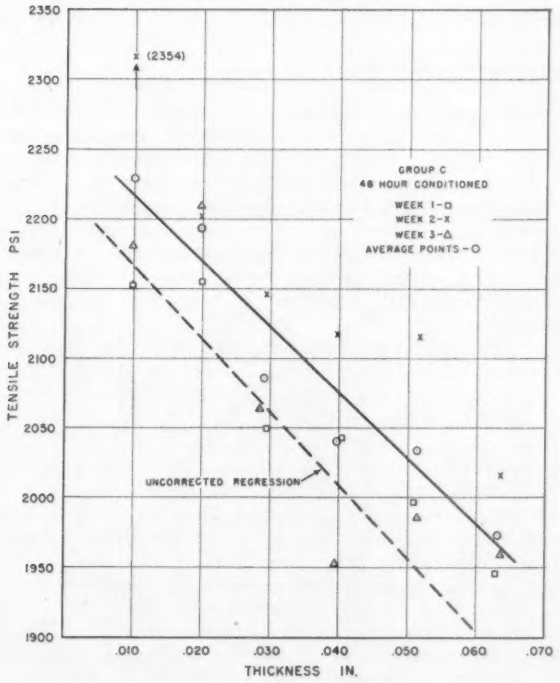


FIG. 10—Corrected tensile strength versus thickness —48-hour conditioned sets.

TABLE XI—EFFECT OF OPERATOR AND DAY ON TENSILE STRENGTHS OF SPRAY-FORMED FILMS

Operator		A			B			C		
Day	Film No.	1	2	3	1	2	3	1	2	3
I		1739	1731	1532	1683	2016	1962	1500	1894	1762
		1714	1885	1588	——	2083	2117	1618	2129	1683
		1786	1914	1517	1628	2052	2087	1500	2250	1547
		1839	1947	1602	1775	2188	1726	1557	2073	1767
		1750	1720	1585	1652	1963	2178	1657	2000	1732
II		1467	1846	1672	1471	1985	2171	1392	2155	1729
		1504	1865	1800	1444	1971	2157	1467	2224	1667
		1321	1865	1772	1587	2188	1949	1364	2259	1579
		1464	1740	1719	1581	2145	1959	1424	2033	1705
		1554	1780	1661	1721	2109	2098	1456	2000	1702
III		1607	1766	1700	1586	2200	2095	1650	2080	1775
		1571	1788	1700	1574	2129	2038	1732	2231	1832
		1866	1766	1683	1632	2145	1953	1625	2179	1774
		1831	1503	1672	1642	2069	1974	1650	2048	1810
		1813	1709	1637	1514	2235	2057	1545	2207	1891
Mean		1655	1788	1656	1606	2102	2034	1543	2118	1730
Standard Deviation		168	108	81	91	86	117	110	110	90

TABLE XII—ANALYSIS OF VARIANCE—EFFECT OF OPERATOR AND DAY ON THE TENSILE STRENGTH OF SPRAY-FORMED FILMS

Source of Error	Degrees of Freedom	Sum of Squares	Variance	F Test [a]
Total	133	7,422,695	——	——
Between	8	5,914,343	——	——
Days	2	3,581,482	1,790,741	148.4
Operators	2	1,093,139	546,570	45.3
Days-Operators Interaction	4	1,239,722	309,930	25.7
Within	125	1,508,352	12,067	——

(a) All F values indicate a significant effect.

TABLE XIII—REGROUPED DATA TO COMPENSATE FOR EFFECT OF OPERATOR AND DAYS

	Group No.								
	1	2	3	4	5	6	7	8	9
	A_1 I 1739	A_2 I 1731	A_3 I 1532	A_1 II 1467	A_2 II 1846	A_3 II 1672	A_1 III 1607	A_2 III 1766	A_3 III 1700
	1714	1885	1588	1504	1865	1800	1571	1788	1700
	1786	1914	1517	1321	1865	1772	1866	1766	1683
	1839	1947	1602	1464	1740	1719	1831	1503	1672
	1750	1720	1585	1554	1780	1661	1813	1709	1637
	B_2 II 1985	B_3 II 2171	B_1 II 1471	B_2 III 2200	B_3 III 2095	B_1 III 1586	B_2 I 2060	B_3 I 1962	B_1 I 1683
	1971	2157	1444	2129	2038	1574	2083	2117	——
	2188	1949	1587	2145	1953	1632	2052	2078	1628
	2145	1959	1581	2069	1974	1642	2188	1726	1775
	2109	2098	1721	2235	2057	1514	1963	2178	1652
	C_3 III 1775	C_1 III 1650	C_2 III 2080	C_3 I 1762	C_1 I 1500	C_2 I 1894	C_3 II 1729	C_1 II 1392	C_2 II 2155
	1832	1732	2231	1683	1618	2129	1667	1467	2224
	1774	1625	2179	1547	1500	2250	1579	1364	2259
	1810	1650	2048	1767	1557	2073	1705	1424	2033
	1891	1545	2207	1732	1657	2000	1702	1456	2000
Mean	1887	1849	1758	1772	1803	1794	1828	1713	1843
Std. Dev.	156	201	296	307	202	225	200	276	237

$$F^* = \frac{56{,}695 \text{ (125 degrees of freedom)}}{41{,}980 \text{ (8 degrees of freedom)}} = 1.35$$

(*) F value indicates no significant difference between the means.

"Days" error was obtained by determining the variations of the means of $A_1 + B_1 + C_1$, $A_2 + B_2 + C_2$, and $A_3 + B_3 + C_3$. The "Operators" error was obtained by determining the variations of means of $A_1 + A_2 + A_3$, $B_1 + B_2 + B_3$, and $C_1 + C_2 + C_3$. The use of 8 degrees of freedom in Table XII for the between group error, rather than 26 degrees of freedom which would be obtained if the groups of specimens from each film on each day were considered as entities, is believed valid. In Part I it was shown that sampling from three different films was necessary in order to obtain a representative sample. The values obtained from the three films of each operator on each day were therefore considered as a unit.

In order to achieve reproducible tensile values with spray-formed films, not only must three films be used, but they must be sprayed on different days in order to get a more valid sampling of the operator's spray technique. Even with this, however, reproducible values between operators are not obtained. Thus it appeared probable that not only must three films be prepared, each on a different day, but they must be prepared by different operators.

In order to test this hypothesis, the data from Table XI were regrouped in the following manner: A_1 I + B_2 II + C_3 III, A_2 I + B_3 II + C_1 III, A_3 I + B_1 II + C_2 III, A_1 II + B_2 III + C_3 I, A_2 II + B_3 III + C_1 I, A_3 II + B_1 III + C_2 I, A_1 III + B_2 I + C_3 II, A_2 III + B_3 I + C_1 II, and A_3 III + B_1 I + C_2 II, and are listed according to these groupings in Table XIII. It is realized that a far greater number of combinations of the data are possible, but it is felt that the nine combinations used are representative and sufficient in number to test the validity of the hypothesis.

The F value indicates no significant difference in means. The calculated standard error of the sample means was found to be 53.1 psi. It must be emphasized that the described sampling technique does not reduce the standard deviation of the sample; in fact it results in an increased standard deviation. The significance of the sampling technique is that the samples obtained from three operators on three different days is an unbiased sample, whereas any sample previously obtained from one operator or one day was biased. The increased standard deviation obtained by sampling days and operators both is an unbiased estimate of the population variance, which is, in fact, large.

It is not known whether the use of this sampling technique will result in reproducible tensile values between laboratories.

General Discussion

When evaluating the tensile strength of spray-formed films, the selection of the mean tensile strength of one film as being representative of a formulation can lead to erroneous conclusions. Although sampling from three films prepared by different operators on different days gives an unbiased estimate of the true mean, decisions on acceptance or rejection of a compound may be subject to error. In order to minimize chances of error, it is recommended that a method of sequential analysis be adopted.

Bowell and Rush (*5*) have reported that the error involved in the determination of tensile strength, ultimate elongation, and modulus at 300 per cent extension at different times of cure (rubber specimens) are so great and, particularly, so unpredictable that the results should not be used as a basis for action such as rejection of a lot. A small test performed at this laboratory with rubber specimens has indicated that an analysis and sampling technique similar to that described in this report may be of considerable value to the rubber industry.

A method of sequential analysis *(6)* would function as follows: Assuming a variance of 2815 for group means, a figure derived from the data listed in Table XIII, the limits are so established that the probabilities of accepting a material which is inferior, or rejecting a material which is superior, are five chances in a hundred.

(Continued on page 564)

Compounding Studies of Kel-F Elastomer

By C. B. GRIFFIS and J. C. MONTERMOSO

Quartermaster Research and Development Center, Natick, Massachusetts

TO meet the needs of the Armed Forces for materials exhibiting elastomeric properties over a wide range of climatic conditions and having resistance to a wide variety of chemicals, studies in the field of fluorocarbons have been made. In the course of these investigations several fluorine-containing elastomers having unusual chemical resistant properties were developed. Kel-F* Elastomer, one of these fluorocarbons, has been made in sufficient quantity for compounding studies. As this material is representative of a group of saturated fluorocarbon elastomers, compounding studies should be applicable to other elastomers of this general type.

Kel-F Elastomer is a fully saturated fluorocarbon containing more than 50% fluorine by weight. It contains within the polymeric chain the following groups: CF_2, CFCl and CH_2. As there is no unsaturation along the polymer chain, the usual rubber compounding recipes could not be used. Also, the raw material is tough and does not break down with prolonged milling. To facilitate processing, softeners were included in the compounding studies. As the "gum stocks" were under 2000 psi tensile strength, reinforcing materials were included in the compounding studies.

As the raw Kel-F Elastomer exhibits rubbery rather than plastic properties, it is necessary to vulcanize this material to obtain useful products.

Curative Studies

Successful oxidative cures have been reported for polyfluoroprene (*1*), saturated acrylic resins (*2*), Lactoprene EV (copolymer of 95 mole percent ethyl acrylate and 5 mole percent chloroethyl vinyl ether) (*3*), chlorine-containing acrylic elastomers (*4*), chlorine-containing butadiene copolymers (*5*), and silicone rubber (*6*).

Successful sulfur-accelerator cures have been reported for Lactoprene EV (*2*), chlorine-containing acrylic elastomers (*4*), and copolymers of butadiene and dichlorodifluoroethylene (*7*).

Successful polyamine cures have been reported for Lactoprene EV (*2*) and chlorine-containing acrylic elastomers (*4*).

Sulfur-accelerator cures for Kel-F Elastomer were tried first. The general formulas used were as shown in Table I.

Although the sulfur-accelerator stocks were hard and brittle no cure was effected. Gum stocks were made with the same general formula and these stocks were soft and pliable, but again no cure was effected. Tensile strengths of the gum stocks were less than for the raw polymer. The hard brittle loaded stocks could not be tested for tensile strength so solvent action tests were made for detecting cross-linking. As the raw polymer dissolved completely in acetone, it was felt that the material which would not dissolve in acetone after the curing process would indicate evidence of cross-linking. All of the sulfur-accelerator stocks dissolved in acetone.

A variety of oxide cures was next tried for cross-linking Kel-F Elastomer. Included were lead peroxide, XLC magnesia, p-quinonedioxime and benzoyl peroxide. Typical formulas are shown in Table II. All of the oxide stocks dissolved in acetone. None showed any improvement in tensile strength and modulus over the raw rubber.

A polysulfide stock was made with the formula shown in Table III. This stock gave swollen rubber in acetone and was the first stock made that showed evidence of cross-linking. Several different stocks were made using polysulfide, but all the stocks were hard and brittle and were practically impossible to process.

Oxide-amine cures had been reported for Lactoprene EV and these were next tried, with the general formulas

Note: This paper was presented before the 66th Meeting of the Division of Rubber Chemistry, American Chemical Society, New York, N. Y., September 15-17, 1954.

* Kel-F is the registered trade-mark of the M. W. Kellogg Co., Jersey City, N. J., for their fluorocarbon polymers.

TABLE I—FORMULAS FOR SULFUR-ACCELERATOR CURES

	A	B
Kel-F Elastomer	100.0	100.0
HAF Black	40.0	30.0
Zinc Oxide	5.0	5.0
Stearic Acid	1.0	1.0
Benzothiazyl Disulfide	—	1.0
Tetramethyl Thiuram Monosulfide	0.4	—
Diphenylguanidine	0.2	—
Sulfur	2.0	2.0

TABLE II—FORMULAS FOR OXIDE CURES

	A	B	C
Kel-F Elastomer	100	100	100
HAF Black	30	30	20
Lead Peroxide	10	10	—
XLC Magnesia	15	—	—
p-Quinonedioxime	—	2	—
Zinc Oxide	5	5	—
Benzoyl Peroxide	—	—	10

TABLE III—FORMULA FOR POLYSULFIDE CURES

Kel-F Elastomer	100
HAF Black	30
Stearic Acid	1
Na_2S_x	3

TABLE IV—FORMULAS FOR OXIDE-AMINE CURES

	A	B
Kel-F Elastomer	100	100
HAF Black	40	—
Lead Peroxide	10	—
p-Quinonedioxime	2	—
Triethylene Tetramine	2	3
XLC Magnesia	15	—
Benzoyl Peroxide	—	5

TABLE V—FORMULAS FOR POLYAMINE CURES

	A	B	C
Kel-F Elastomer	100	100	100
Triethylene Tetramine	5	—	—
Hexamethylene Tetramine	—	5	—
4, 4′-diamino phenylmethane	—	—	5
Press Cure 60 min. at 260°F.			
Tensile Strength, psi	1360	200	200
Press Cure + Oven Cure 16 hrs. at 212°F.			
Tensile Strength, psi	1590	250	200

shown in Table IV. Although these stocks were either hard and brittle or were spongy and could not be tested for tensile strength, they gave swollen rubber in acetone, indicating cross-linking.

The benzoyl peroxide-amine stock reacted violently on the mill and gave a soft sponge stock when cured in the press. This sponge stock gave swollen rubber in acetone and when dried after acetone immersion returned to the original tough plastic-like sponge.

Since the oxide-amine type stock gave evidence of cross-linking several polyamines were investigated, using the general formulas shown in Table V. The bifunctional triethylene tetramine gave cured stocks which yielded swollen rubber in acetone while the hexamethylene-tetramine which has no functional amine groups and the 4,4′-diamino phenylmethane yielded stocks which dissolved in acetone. The tensile strength of the triethylene tetramine stock was much greater than the raw rubber. However, the triethylene tetramine scorched the stock on the mill beyond any useful processing technique.

Diisocyanates were next tried for cross-linking Kel-F Elastomer. The first diisocyanate used was DuPont's MDI-50 [50% methylene bis (4 phenylisocyanate) and 50% ortho-dichlorobenzene] in the general formula shown in Table VI. This cured stock gave swollen rubber in acetone and high tensile strength. Also, the vulcanizate was soft and rubbery. The MDI-50 was difficult to mill into the rubber, although there was no evidence of scorching while adding the MDI-50. As a long oven cure following press cure was needed to get well-cured stocks,

TABLE VI—FORMULA FOR DIISOCYANATE CURE

Kel-F Elastomer	100
MDI-50	5
Zinc Oxide	5
Press Cure 20 min. at 212°F.	
Tensile Strength, psi	850
Press Cure + Oven Cure 16 hrs. at 212°F.	
Tensile Strength, psi	1800

an investigation of other types of diisocyanates was made to increase processing ease. The following diisocyanates were made and compounded with Kel-F Elastomer:

(1) Methylene bis (4 Phenylisocyanate) (MDI).
(2) Toluene - 2,4 - diisocyanate.
(3) 1 - Trifluoromethyl benzene - 3-5, diisocyanate.
(4) Ortho - ortho′ - dichlorobenzidine diisocyanate.
(5) 2-3-5-6, tetrachlorobenzene diisocyanate.
(6) Benzene, 1-4 diisothiocyanate.

All of these diisocyanates and the diisothiocyanate stocks gave swollen rubber in acetone and increased tensile strengths. But all of the stocks required an oven cure after the press cure to obtain good tensile strength. Also, the presence of zinc oxide was needed for stocks having good tensile strength.

A systematic study using MDI and ortho-ortho′-dichlorobenzidine diisocyanate was undertaken. These two diisocyanates were selected because of ease of processing and superior stocks. It was found that similar cures could be obtained using either MDI or ortho-ortho′-dichlorobenzidine diisocyanate. However, MDI is preferable because its cures are less erratic and can be better controlled through variation of temperatures in both oven and press cures. Both diisocyanates give their best cures in the presence of zinc oxide, 5 parts being sufficient for MDI and 10 parts for ortho-ortho′-dichlorobenzidine diisocyanate. Both diisocyanates needed oven cure after press cure for best results. Typical test results of stocks prepared with diisocyanate cures are given in Table VII.

To improve the diisocyanate cures and to try developing stocks which could be completely cured with just a press cure, amine-modified diisocyanate cures were investigated. General formulas of this type of cure are shown in Table VIII.

The best amine found in this study was hexamethylene tetramine. The triethylene tetramine is difficult to incorporate into the stock on the mill. It is practically impossible to incorporate more than one part per hundred rubber without serious scorching. On the other hand, the hexamethylene tetramine goes in with ease and no sign

TABLE VII—TEST RESULTS OF DIISOCYANATE (MDI) CURED STOCKS

Tensile Strength, psi	1550
Ultimate Elongation, %	350
Stress at 300% Elongation, psi	950
Hardness Shore A, 5 Sec. Reading	60
After 24 hours immersion at 73 ± 3°F.*(8)*	
Percent Volume Swell in 40% aromatic fuels	0.80
Percent Volume Swell in Diisobutylene	0.05
Low Temperature Tests	
Retraction Test (9)	
Initial Elongation, %—200	
TR-10 (Minus °C.)	16.8
TR-30 (Minus °C.)	14.9
TR-50 (Minus °C.)	13.2
TR-70 (Minus °C.)	+1
Brittle Point *(11)*—60°F.	
Gehman Test (10)	
T100 (Minus °C.)	17.0
T10 (Minus °C.)	4.5
T5 (Minus °C.)	2.3
T2 (Minus °C.)	+1.5

TABLE VIII—FORMULAS FOR AMINE-MODIFIED DIISOCYANATE CURES

	A	B	C	D	E	F
Kel-F Elastomer	100	100	100	100	100	100
Zinc Oxide	5	—	5	—	5	5
MDI	5	5	5	5	5	5
Triethylene Tetramine	1	5	—	—	—	—
Hexamethylene Tetramine	—	—	1	10	—	—
Hepteen Base	—	—	—	—	5	—
Tri Mal	—	—	—	—	—	5
Press Cure—Time-Min./Temp. °F.	60/260	60/292	60/260	30/292	60/260	60/260
Tensile Strength, psi	1375	1625	290	2100	500	400

TABLE IX—FORMULAS FOR BENZOYL PEROXIDE CURES

	A	B	C	D
Kel-F Elastomer	100	100	100	100
Benzoyl Peroxide	1.5	1.5	1.5	1.5
$Ca(OH)_2$	—	5	—	—
Zinc Oxide	—	—	5	5
Silicone-Treated Hi-Sil C*	—	—	—	20
Pressure Cure 60 min. at 230°F.				
Tensile Strength, psi	500	650	875	1700
Press Cure + 48 hrs. at 240°F.				
Tensile Strength, psi	500	1200	1700	3900

* Sample from Linde Air Products Co., Tonawanda, N. Y. (Sample is Hi-Sil C coated with 7.7% LM-3 Silicone Oil.)

of scorching. Hepteen Base, a heptaldehydeaniline reaction product, and Tri Mal, both basic materials, do not accelerate the diisocyanate cure. Also tried as accelerator to the diisocyanate cure were cobalt naphthalate, sodium methylate, pentamethylene glycol, and a combination of diethyl oxylate and sodium methylate. None of these materials accelerated the diisocyanate cure.

As a stock having good physical properties and easy processing had been developed using MDI, accelerated with hexamethylene tetramine, these stocks were subjected to chemical resistance tests. They had excellent resistance to petroleum-base fuels but very poor resistance to strong oxidizers.

Work concurrently in progress at the M. W. Kellogg Company had indicated that good cures of Kel-F Elastomer with benzoyl peroxide in the presence of a base-forming metallic oxide could be obtained. Benzoyl peroxide cures of the types shown in Table IX were studied.

Here is illustrated the need for the presence of an acid acceptor for the benzoyl peroxide cure of Kel-F Elastomer. The most unusual cure with benzoyl peroxide was in conjunction with the silicone-treated Hi-Sil C. A stock was made with this cure that had a tensile strength of 3900 psi and was not stiff and boardy. Apparently the silicone-treated filler reacted chemically with the benzoyl peroxide forming a type of cross-link not previously obtained with benzoyl peroxide. Solvent action results also indicate a new type of more efficient cross-linking. Stocks containing benzoyl peroxide alone dissolve in acetone, stocks containing benzoyl peroxide with zinc oxide form gelatenous rubber in acetone, whereas stocks containing benzoyl peroxide, zinc oxide and silicone-treated Hi-Sil C form swollen rubber in acetone.

A comparison of the effect of strong oxidizers on three types of vulcanizates of Kel-F Elastomer is shown in Table X. The stocks cured by benzoyl peroxide, zinc oxide and silicone-treated Hi-Sil C have the best physical properties and the best resistance to strong oxidizers of all the stocks developed to date. The diisocyanate-amine cured stocks have the best resistance to petroleum base fuels.

The results of 48 hours immersion in acetone on stocks representative of the various types of cures are given in Table XI.

Reinforcement Filler Studies

As the tensile strengths of gum stocks of Kel-F Elastomers were less than 2000 psi, an investigation of reinforcement fillers for the vulcanizates was made. The comparative results are listed in Table XII.

The results indicate the best stocks obtained with the respective fillers. Loadings of blacks over 10 parts per hundred rubber gave stocks that were too boardy, but

TABLE X—EFFECTS OF STRONG OXIDIZERS ON KEL-F ELASTOMER VULCANIZATES

(Samples press cured 60 min. at 230°F. and oven cured 64 hrs. at 250°F.)

	A	B	C
Kel-F Elastomer	100	100	100
Benzoyl Peroxide	1.5	1.5	—
Zinc Oxide	5	5	5
Silicone-Treated Hi-Sil C	20	—	20
Hi-Sil C	—	20	—
MDI	—	—	5
Triethylene Tetramine	—	—	1

After Immersion in White Fuming Nitric Acid

Time of Immersion 73 ± 3°F.	Tensile Strength, psi	Elongation, %	Hardness Shore "A"
	Stock A		
0	3300	290	76
2 hours	3250	290	75
24 hours	2800	280	66
48 hours	2600	270	66
144 hours	1400	260	60
	Stock B		
0	1550	510	76
2 hours	1700	390	72
144 hours	100	1300	30
	Stock C		
0	2500	310	77
2 hours	Sample became spongy—could not test		

with higher loadings, tensile strengths of 3300 psi were obtained with HAF Black. The outstanding reinforcing filler was a silicone-treated Hi-Sil C. As the tensile strength of this pigment in the stock cured with diisocyanate was the same as stocks with the same cure but having Hi-Sil C, it was felt that the outstanding properties of silicone-treated Hi-Sil C was not due only to the better dispersion of this filler. Rather, it is felt, that when this silicone-treated filler is used with benzoyl peroxide a chemical reaction takes place between filler-coating and polymer. Infra-red studies to date have *not* indicated that such a chemical reaction takes place. Also, volume swell of silicone-treated Hi-Sil C stocks in petroleum-base fuels did not indicate a "tighter" cure than ordinary Hi-Sil C.

TABLE XI—RESULTS OF VARIOUS CURED VULCANIZATES AFTER 48 HOURS IMMERSION IN ACETONE

Type and Method of Cure	Visual Observation After 48 Hours Immersion in Acetone
Sulfur-accelerator loaded stocks, 60 min. at 300°F.	Dissolved
Sulfur-accelerator gum stocks, 60 min. at 300°F.	Dissolved
Metallic Oxide only	Dissolved
Metallic Oxide plus Organic Oxide	Dissolved
Benzoyl Peroxide	Dissolved
Polysulfide	Swollen Rubber
Oxide-Amine	Swollen Rubber
Amine (bi-functional Triethylene Tetramine)	Swollen Rubber
Amine (Hexamethylene Tetramine)	Dissolved
Diisocyanate (MDI-50)	Swollen Rubber
Diisocyanate-Amine	Swollen Rubber
Benzoyl Peroxide-Zinc Oxide	Swollen Rubber*
Benzoyl Peroxide-Zinc Oxide-Silicone Treated Silica Pigment	Swollen Rubber

* Gelatenous.

TABLE XII—REINFORCEMENT FILLER RESULTS

	Blacks			Silicas				Other
Kel-F Elastomer	100	100	100	100	100	100	100	100
Zinc Oxide	5	5	5	5	5	5	5	5
MDI	5	5	5	5	—	5	—	5
Triethylene Tetramine	—	—	—	—	—	—	—	1
Benzoyl Peroxide	—	—	—	—	1.5	—	1.5	—
HAF Black	10	—	—	—	—	—	—	—
Fine Thermal	—	10	—	—	—	—	—	—
Medium Thermal	—	—	10	—	—	—	—	—
Hi-Sil C	—	—	—	20	20	—	—	—
Silicone-Treated Hi-Sil C	—	—	—	—	—	20	20	—
Calcium Fluoride	—	—	—	—	—	—	—	25
Tensile Strength, psi	1600	2800	1590	2400	1550	2500	3900	500
Elongation, %	360	320	230	330	510	310	440	750
Hardness, Shore A, 5 Sec. Reading	68	66	64	78	76	75	69	71

Softener Studies

Kel-F Elastomer as it is now made is tough and does not break down on the mill as does natural rubber. To disperse any compounding ingredient into the elastomer the stock must be constantly cut from side to side and mixed. Although the rubber bands well and has a rolling bank, the compounding ingredients are not dispersed.

Mixed stocks of Kel-F Elastomer are difficult to mold, calender and extrude because of lack of plasticity. To develop stocks which could be easily mill or Banbury mixed and stocks that could be calendered, extruded, and easily molded, a softener study was conducted.

Both high and low molecular weight softeners were included in the study. Table XIII lists results of the better stocks prepared using both high and low molecular weight softeners.

Saturated high molecular weight softeners were selected with resistance to strong oxidizers in mind. These included Indoil, Lactoprene BN-12, Vistanex, hydrogenated liquid polybutadiene, Butyl-15, Thiokol ST, Kel-F Telomer and TB-90-B. All of these materials improved processing but the resultant stocks had poor resistance to strong oxidizers.

A variety of low molecular weight softeners (plasticizers) were screened by volume swell tests. The softeners in which the Kel-F Elastomer had a volume swell of 50% or more were selected to be compounded with Kel-F Elastomers. All of the stocks compounded with softeners that gave improved processing had poor resistance to strong oxidizers. However, as stocks compounded with diisocyanate-amine curatives and no softener have poor resistance to strong oxidizers, it is felt that the resistance to strong oxidizers was not due to the addition of the softener. Softener studies using benzoyl peroxide as the curative are under investigation.

TABLE XIII—RESULTS OF SOFTENER STUDY

(Stocks press cured 60 min. at 260°F. and oven cured 16 hrs. at 212°F.)

Kel-F Elastomer	100
Zinc Oxide	5
MDI	5
Triethylene Tetramine	1
Softener (as indicated)	10

Softener	Tensile Strength, psi	Ultimate Elongation, %	Stress at 300% Elongation, psi	Hardness Shore A 5 Sec. Read.
None	1700	330	1350	68
Polymer Type Softeners				
Vistanex	1230	330	820	53
Butyl-15	1450	320	1150	54
TP-90-B	420	730	250	53
Hycar OR-15	2820	300	2820	72
Thiokol ST	2500	320	2100	63
Low Molecular Weight Softeners				
Hercoflex 600	1125	460	400	55
Dioctyl Sebacate	1100	520	600	56
Flexol 4GO	1000	580	300	55
Flexol TOF	700	725	175	50

Summary

A variety of cross-linking mechanisms have been investigated for vulcanizing Kel-F Elastomer. The best cure for resistance to petroleum base fuels was achieved with MDI, zinc oxide and hexamethylene tetramine. This cure also had the advantage of not needing a long oven cure after the press cure. The press cure alone gave optimum physical properties. The best cure for resistance to strong oxidizers was achieved with benzoyl peroxide, zinc oxide and a silicone-treated silica pigment.

A variety of fillers reinforce Kel-F Elastomer. The outstanding reinforcing filler investigated was a silicone-treated silica pigment.

Many of the softeners and plasticizers used in the rubber industry for softening rubber and synthetic elastomers can be used with Kel-F Elastomer.

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LITERATURE REFERENCES

(1) Mochel, W. E., Salisbury, L. F., Barney, A. L., Coffman, D. D., and Meighton, C. J., *Ind. Eng. Chem.*, **40,** 2285 (1948).
(2) Mast, W. C., *Ind. Eng. Chem.*, **36,** 1022 (1944).
(3) Dietz, T. J., Mast, W. C., Dean, R. L., and Fisher, C. H., *Ind. Eng. Chem.*, **38,** 960 (1946).
(4) Mast, W. C., and Fisher, C. H., *Ind. Eng. Chem.*, **40,** 107 (1948).
(5) Lowery, C. E., and Stanton, G. W., *Ind. Eng. Chem.*, **41,** 1949 (1949).
(6) Spencer, W. B., Davis, W. B., Kilbourne, F. L., and Montermoso, J. C., *Ind. Eng. Chem.*, **45,** 1297 (1953).
(7) McBee, E. T., Hill, H. M., and Bachman, G. M., *Ind. Eng. Chem.*, **41,** 70 (1949).
(8) ASTM Designation D471-52T.
(9) Smith, O. H., Hermonat, W. A., Haxo, H. E., and Meyer, A. W., *Anal. Chem.*, **23,** 322 (1951).
(10) ASTM Designation D1053-52T.
(11) ASTM Designation D746-52T.

How a Bulk Material Handling Problem Was Solved by American Cyanamid

ONE of the most interesting and unusual installations of the well-known Tote Bins, made by Tote System, Inc., of Beatrice, Nebraska, has recently gone on stream in American Cyanamid's plant for making its rubber accelerators at the Organic Chemicals Division in Bound Brook, N. J.

Cyanamid's problem was fairly straightforward. They needed a system of transporting a finely ground, fairly free-flowing chemical raw material from its point-of-supply in one building (A) to its point-of-use in another building (B) some distance away. At its point-of-use the material had to be metered into any one of several reactors. To charge the amount required involved metering fractional portions of the contents of a Tote Bin.

The traditional way of solving this material handling problem would have involved something like the following:

(a) Temporarily "package" the powdered material at point-of-supply (Building A) into some sort of metal or fiber drums for transportation to point-of-use (Building B).

(b) Transport the material to Building B.

(c) Have a man or team of men available in Building B to unload the containers, open each and discharge the contents (probably by hand) into some sort of hopper-metering arrangement which would feed into the reactor. Such a system, of course, has obvious drawbacks, such as:

1. Filling the empty containers is a slow, dusty and troublesome operation. (In some cases there can also be a health hazard with dusty materials, whether toxic or not, or an explosion hazard with combustible dusts. Neither of these, however, was involved in Cyanamid's situation.)

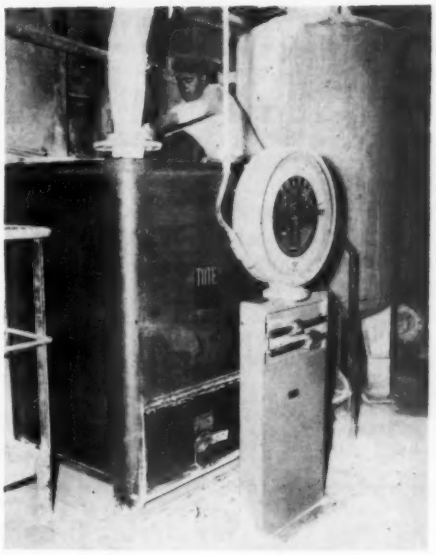

FIG. 3—View of the Tote bin filling station. Each bin is automatically filled with over 1,000 pounds of raw material.

2. Some of the product is lost in spillage or as dust in the air. There is also danger of contamination of the product.

3. The size of the container is dictated by the amount a man can lift, and is, therefore, quite small. Besides,

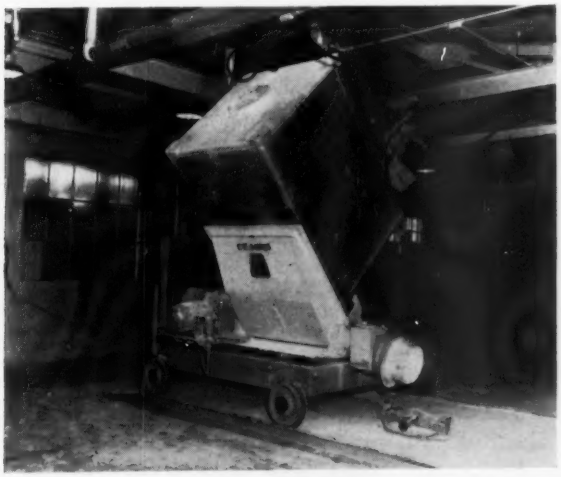

FIG. 1—The Tote Tilt holds the bin at a 45 degree angle for discharging purposes. Note the rail arrangement and the discharger spout above the reactor head.

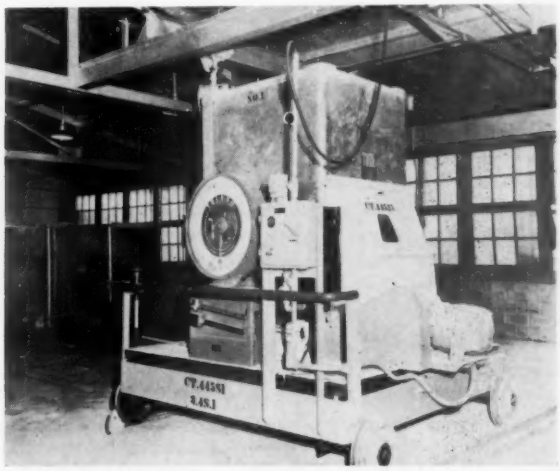

FIG. 2—This weigh scale indicates by change of weight how much material has been fed into a reactor. Note the bins conveniently stored in the corner of the building.

there is a considerable amount of labor involved in filling the containers, sealing and unsealing, and in discharging into the process, stacking and unstacking the containers, etc.

With the help of Robert E. Parker and other members of its technical staff, Cyanamid neatly solved its problem with 12 Tote Bins and an ingenious "tilt on wheels." This ambulatory arrangement consists of:

1. A Tote Tilt which is a mechanism for holding the bins at a 45-degree discharge position (Figure 1). At this position the bin's hinged door opens and the material drops into a screw feeder which uniformly feeds the material out of a side discharge spout into the reactors.

2. A weigh scale which indicates by change in weight how much material has been fed into a reactor (Figure 2). The scale pointer also indicates by uniform motion (or lack of it) that the bin contents are being discharged uniformly (or that bridging has not occurred).

3. When bridging does occur, the operator merely actuates a vibrator, after the scale has been locked, which helps resume the smooth flow of material.

All of the above equipment is fixed to a wheeled platform on rails. By means of a handle, an operator can easily push the entire rig from one reactor to the other. Thus, one tilting mechanism does the work of two. As for the Tote Bins themselves, they have the following advantages:

Each bin is automatically filled with a given specific weight in excess of 1,000 pounds of material from a closed system (Figure 3). No dust; no spillage; no contamination; no excessive labor.

FIG. 4—Electric lift trucks are used to convey the Tote bins to the tilters. Only one operator is required for such conveying. Hand lift trucks can also be utilized.

The bins are easily moved by hand or power lift truck (Figure 4), by one operator, to an interplant trailer which holds eight bins. Thus, they are easily and economically moved from one building to another.

Tensile Strength Testing of Vinyl Films

(Continued from page 558)

The limits of the test can be established for any desirable confidence limit. For example, let us assume that an inferior material is defined as one which has a true mean tensile strength of less than 1350 psi, and a superior material is one whose true mean tensile strength is greater than 1500 psi. If 1350 psi is the specified minimum acceptable value, a batch should be rejected if the mean tensile value of a test is below 1370 psi, and should be accepted if above 1480 psi, and should be retested in accordance with sequential methods (*6*) if between these two values. This means, in essence, that any material accepted can be expected to give spray-formed films exhibiting a tensile strength equal to or greater than the established minimum value 95 per cent of the time when sprayed, sampled, and tested in the prescribed manner.

It is realized that the variance on which the limits of the described sequential analysis are based has been obtained from a relatively small number of tests. It is expected that when more data have been accumulated the figures will be adjusted if required.

Conclusions

1. The tensile strength values of spray-formed vinyl films are affected significantly by variations in formulation, conditions of film preparation, and aging.

2. The tensile strength of cast vinyl films decreases with increasing specimen thickness within the values tested.

3. The practice of assuming that the width of a tensile specimen is equal to the width of the tensile specimen die may lead to erroneous results.

4. Vinyl films must be sprayed or cast on different days to compensate for uncontrolled day-to-day variations in spraying and casting techniques.

5. In order to obtain reproducible tensile strength results within a laboratory, it is necessary to sample from three films, each prepared on a different day and by a different operator.

Recommendations

1. For qualification and acceptance testing of spray-formed vinyl films, the test sample should consist of fifteen specimens, five specimens obtained from each of three different films each spray-formed on different days by different operators. The tensile results of the fifteen specimens shall be used to obtain a mean value.

2. For qualification and acceptance testing of spray-formed vinyl films, rather than accept a single value as representative of a given batch or formulation, a method of sequential analysis should be used.

3. A cooperative program should be undertaken to determine the reproducibility between laboratories of tensile strength results obtained by the prescribed sampling technique.

LITERATURE REFERENCES

(1) Berger, L., and Weber, I., "Tensile Strength Testing of Spray-Formed and Cast Vinyl Films. Part I—Preliminary Analyses," *Rubber Age,* Vol. 76, pp. 551-61 (1955).
(2) Newton, R. G., "Comparison of Tensile Test Results Obtained in Different Laboratories," *J. Rubber Research,* Vol. 14, pp. 113-40 (1945).
(3) Davies, O. L., and Horrobin, S., "The Errors in Tensile Strength Testing," *Trans. I. R. I.,* Vol. 12, pp. 85-92 (1936).
(4) Morris, H. B., and Gerwals, C. H., "Variations of Physical Tests of Elastomers Between Different Laboratories," *Rubber Age,* Vol. 61, pp. 323-27 (1947).
(5) Bowell, S. T., and Rush, I. C., "The Errors of Stress-Strain Testing," *Rubber Age,* Vol. 72, pp. 215-19 (1952).
(6) Churchman, C. W., "Statistical Manual: Methods of Making Experimental Inferences," Pitman-Dunn Laboratories, Frankford Arsenal, Philadelphia, Penna., June, 1951, page 131.

Editorials . . .

Industry Growth

BUSINESS in the rubber industry is good! Reports continue to reach us from all parts of the country and from large and small manufacturers attesting to this fact. The demand for rubber technologists of all kinds—chemists, engineers, production men, designers—is high and competition for experienced men is keener than it has been in many years. Suppliers are expanding their sales staffs. Rubber manufacturers are expanding their production facilities. Mergers and acquisitions continue to be the order of the day.

If we needed further proof of the current boom in the industry, we need but look at some of the statistics. For example, new rubber consumption for the month of May amounted to 130,411 long tons. This was the second highest consumption month on record, exceeded only by the 135,590 long tons consumed in March of this year. Consumption of reclaimed rubber in May amounted to 27,500 long tons, almost 34% above that recorded in May of last year. Shipments of passenger car tires in May reached 8,663,386 units, 1,300,000 units higher than shipments in May, 1954. And so it goes.

Some interesting figures relative to the growth of the rubber industry were recently quoted by K. O. Nygaard, a Goodrich economist, in a talk before the National Association of Cost Accountants. Mr. Nygaard contrasted the peak consumption of 1,338,000 long tons recorded in 1953 with the 20,000 tons used in 1900 and the 206,000 tons used in 1920. Discussing the tremendous expansion in our national industrial production during the past 25 years, he emphasized the point that the rubber industry has been one of the pacemakers in this expansion. In these years, total output was increased by a little more than 110 percent as against a gain of almost 150 percent for the rubber manufacturing field.

As for the future, the Goodrich economist cited several factors which indicate business in the rubber industry will be even better in the coming decades, although the rate of growth cannot possibly match previous history. The factors cited included population growth, the growth in consumer income, the increased use of vehicle transportation, growth in industrial production, and the increase in tire life. Let's take a look at some of these factors.

The population growth in the United States is astounding—152,000,000 in 1950 and an anticipated 177,000,000 by 1960, based on a daily increase of 3600 (5700 births as against 2100 deaths). That means the creation of 25,000,000 potential new customers in a ten-year span.

The demand for new cars and trucks continues to increase. Two-car families are becoming ordinary. There is growing talk of three-car families. Goodrich estimates that for every five cars now on the highways there will be six cars in operation by 1960.

The average factory worker had to put in 53 hours of work in 1939 in order to replace the tires on his car as they wore out. Today, only 23 hours of labor will take care of his annual tire needs and, as Mr. Nygaard points out, this does not even allow for the vast improvements that have been made in tire quality during these years.

Putting all these factors together, Mr. Nygaard comes up with the prediction that we will consume a minimum of 1,520,000 long tons of new rubber in the United States annually by 1960—and at least an equal quantity throughout the rest of the world. Since we used approximately 1,260,000 long tons in 1950, we will fail for the first time to double or nearly double our usage within a ten-year period. The Goodrich economist subscribes this to three reasons: First, the 1950 consumption was abnormally high because of the scare buying of automobiles and all kinds of rubber products due to the Korean situation. Second, the rubber industry now uses a number of new materials, some of which have replaced rubber in many applications. Third, it is far more difficult to double consumption when dealing in millions of tons than when dealing in tens and hundreds of thousands. Nevertheless, a consumption of 1,520,000 long tons by 1960 represents a very healthy rate of growth.

Mr. Nygaard had an additional note of optimism for rubber manufacturers, namely, that the future growth in sales volume will probably be accompanied by a relatively steady growth in earnings, as compared with the erratic changes in the past. The major reason for such a situation is that the rubber manufacturing industry is no longer dependent upon agricultural products to the extent it was before World War II. Man-made materials —synthetic rubbers, rayon, nylon—upon which the industry now heavily leans are far more price stable than the agricultural products, such as natural rubber and cotton. Another stabilizing factor is that the industry is no longer forced to make commitments many months in advance in order to insure satisfactory supplies. The LIFO method of accounting, which many rubber manufacturers have adopted, also contributes to stability.

The days of "boom or bust" and "feast or famine" no longer apply to the rubber manufacturing industry. It is definitely a "growth" industry, which has made important contributions to the American economy. It is heartwarming to be part of such an industry.

Highlights Sidelights *of the News...*

July, 1955

The government of the United States stands to realize a return in excess of $415,000,000 from the transfer of the synthetic rubber facilities to private ownership, according to the Rubber Producing Facilities Disposal Commission...The total amount realized from the sale of twenty-five plants (including Baytown)is $270,796,000, an amount $10,000,000 in excess of the total net cost of the program (page 567).

The Department of Justice has asked the Federal District Court in Washington, D. C. for a summary judgment dismissing a suit by major tire manufacturers and distributors to block a Federal Trade Commission order limiting price discounts on tires and tubes...The continuing battle between the tire manufacturers and distributors and the FTC re the quantity discount ruling goes back to the summer of 1947...The quantity limit proviso itself is in legislative controversy since the Attorney General's National Committee to Study the Anti-Trust Laws recommended its repeal (page 573).

France's Butyl rubber project, preparations for which have been going on for about three years, is getting under way with the formation of a new company...The group of tire manufacturers, oil refining companies and chemical enterprises which formed Syndicat d'Etudes du Butyl Rubber has now organized Société du Caoutchouc Butyl (SOCABU), with an initial capital of about $3,000,000...A plant will be built near Rouen with a capacity of about 20,000 long tons a year (page 574).

About 170 delegates representing fifteen countries attended a symposium on tires held in the headquarters of Rubber-Stichting at Delft...The general purpose of the meeting was to discuss tire behavior on the road...Special attention was also given to the correlation of laboratory and road tests (page 580).

A suit has been filed in New Jersey Superior Court charging five officials of the Thermoid Co. with manipulating the firm's books to avoid $1,000,000 in income taxes...In addition, a group of dissident stockholders has filed preliminary proxy material with the Securities and Exchange Commission aimed at electing a new slate of directors (page 568).

A Federal Grand Jury, meeting in New York City, has returned an indictment against six companies charging restraint of trade in the manufacture and sale of dry colors...The indictment charges that the six companies had engaged in an unlawful combination and conspiracy to restrain competition in the sale of dry colors by agreeing to fix and maintain prices, terms and other conditions of sale (page 598).

NEWS REPORTS and Industry Activities

U.S. TO GET $415,000,000 FROM PLANT SALES; INSTITUTE PLANT MAY BE RE-OFFERED FOR SALE

THE Rubber Producing Facilities Disposal Commission reported to Congress on June 13 that the U. S. Treasury will realize a return in excess of $415,000,000 from the transfer of the government-owned synthetic rubber producing facilities to private ownership. This estimate was made as the Commission recommended the sale of the GR-S copolymer plant at Baytown, Texas, to the United Carbon Co. for $7,153,000. Additional payments by the United Carbon Co. at the time of transfer for various inventories and net additions to the plant are estimated at $1,491,000, bringing the total receipts from the Baytown sale to $8,644,000. Congress had thirty days from June 13 to review the Baytown sale. It approved the sale of 24 other facilities last March.

Meanwhile, bills have been introduced in both the Senate and the House to re-offer the government's GR-S plant at Institute, West Va., for sale to private ownership. The bills were introduced by Senator Harley Kilgore (Dem., West Va.) and Representative Robert C. Byrd (Dem., West Va.). According to Senator Kilgore, Carbide and Carbon Chemicals Co., New York, N. Y., a division of the Union Carbide and Carbon Corp., has expressed an interest in buying the plant and converting it to the production of chemicals and plastics.

The Disposal Commission's report to Congress stated that the net book value of all plants and other assets in the synthetic rubber production program is estimated at $128,088,000, and the government's operating deficit since the start of the program during World War II is estimated at $132,700,000, a total of $260,788,000.

The total amount realized from the sale of twenty-five plants, including Baytown, is $270,796,000. The disposal program, therefore, produced a recovery of over $10,000,000 in excess of the total net cost of the program.

Balance Accounted For

The balance of approximately $145,000,000 to make the $415,000,000 total return to the government, represents amounts paid by plant purchasers for inventories, spare parts, net additions to plants, and finished rubber, plus the return from the operating agency's cash balance and cash generated by the liquidation of the government's rubber producing operations.

A further cash return to the government will result from the disposal, which the Disposal Commission is now negotiating, of some or all of 447 pressure tank cars, still owned by the government. Their net book value ($1,008,000) is included in the remaining investment figures given by the Disposal Commission.

At the moment, the government still owns two plants, the alcohol-butadiene unit at Louisville, Ky., which has been leased to Publicker Industries, Inc., of Philadelphia, Penna., and the Institute GR-S plant. In addition, the government owns the rubber laboratory maintained at the University of Akron and some miscellaneous equipment. The net book value of all these facilities, $13,435,000, is included in the remaining investment figure.

The Institute plant was built as part of the rubber producing program during World War II with a designed capacity of 122,000 long tons of GR-S annually. No bids were received for the plant when it was offered for sale along with the other twenty-six facilities. Under the terms of the disposal act, the Institute synthetic facility when into standby for a three year period.

The bills introduced by Senator Kilgore and Representative Byrd were substitutes for bills they had introduced a few days earlier. The new bills differed from the old mainly in the fact that they would permit direct sales of the government-owned plant, without time-consuming study and review periods.

The Senate bill was sent to the Banking and Currency Committee headed by Senator Fulbright (Dem., Ark.), and Senator Kilgore has already contacted Senator Fulbright to urge hearings on the measure as soon as possible.

In a letter to Senator Fulbright, Senator Kilgore enclosed a copy of an editorial on the sale possibility that appeared in June 16 editions of the *Charleston Gazette*. Senator Kilgore said that: "The editorial sets forth ably and clearly the need for action now on this matter."

The editorial, entitled "Congress Should Clear Rubber Plant for Sale: It Makes Economic Sense," asserted that action is required now if the plant is ever to be a productive member of the Kanawha Valley industrial family, which means so much to all the state's economy."

Spokesmen for Carbide and Carbon have said that their company definitely will be a bidder for the Institute plant if it can be put up for sale without restrictions as to its future use. They would also eliminate provisions of the old sale regulations which require a plant to be maintained as a synthetic rubber producer for a period of ten years.

Dutch Bid For Institute?

As this issue went to press, it was reported from Washington, D. C., that Imperial Commodities Corp., a Dutch-controlled company with huge natural rubber estates in the Far East, may bid for the synthetic rubber plant owned by the U.S. at Institute, West Va. It is reported that Imperial has passed the word around official Washington that it would be interested in acquiring the facility. Special legislation would be required to sell the plant to Imperial. According to present reports, Imperial, if it acquires the plant, will reopen only one of the three production units at the 122,000 long-ton facility. The 40,000 tons which will be produced at the reopened unit will be sold both in the U. S. and abroad. The two remaining units, each of 40,000 long ton capacity, will be reactivated at a later date, the reports state.

SUIT FILED IN THERMOID CASE; STOCKHOLDERS SEEK NEW BOARD

A suit has been filed in New Jersey Superior Court charging five officials of the Thermoid Co., Trenton, N. J., with manipulating the firm's books to avoid $1,000,000 in income taxes. In addition, a group of dissident stockholders has filed preliminary proxy material with the Securities and Exchange Commission in Washington, D. C., aimed at electing a new slate of directors.

The suit charges that the five officials, "by devious methods, schemes and devices", juggled transactions between Thermoid and five subsidiaries in 1951, 1952 and 1953 to avoid Federal corporate income taxes. The suit also charged that expense accounts were padded by the officials for another $1,000,000. It said that Thermoid will have to repay the taxes plus added costs of at least $1,000,000.

The suit was filed against Frederic E. Schluter, chairman of the board; George S. Fabel, president; Russell H. Temple, treasurer; Edgar N. Noel, chief accountant, and Willis B. Oram, head of the Cost Department. Thermoid is also named as a defendant.

Peter A. Bothner of Brooklyn, N. Y., filed the suit. He asked that the five defendants be found guilty of a breach of trust and be held liable for expenses and penalties Thermoid may suffer. The suit charged that the officials shifted Thermoid's profits to five subsidiaries that lost money to take advantage of tax benefits. It said these manipulations totaled $1,056,756 for 1951, 1952 and 1953.

Expense Account Padding Charged

The expense account padding ran over $1,000,000, too, the suit said. Among the items it listed as being improper entries on the company's books was: Purchase of a yacht from Mr. Schluter for $38,000 in 1952, plus yacht expenses of $45,798.72 in the next four years; A $10,000 bonus to Mr. Schluter's wife, Dorothy, who was not employed by the firm, the suit charged; A $28,000 bonus to Mr. Schluter not revealed to the stockholders; A "slush fund" which was paid to "labor leaders, public officials in violation of Federal and state statutes". The suit said the fund was built by overpaying employees for travel expenses and then getting some of the money kicked back; Purchase of a $28,000 seashore home used by the defendants, and seven paintings for Mr. Schluter at a cost of $2,820.

George S. Fabel, president of Thermoid, said the charges made in the court action are untrue. What is factual, he said, has been disclosed fully to stockholders, the Securities and Exchange Commission and the Internal Revenue Service immediately following its discovery in the summer of 1954.

Noting that the name of Peter A. Bothner, who filed the suit, is not to be found on the stockholders records of Thermoid, Mr. Fabel called the action another step in a series aimed "at grabbing control for undisclosed interests working through dummies."

He said all the money alleged to have been spent for personal benefit actually was spent by the company and "solely for the benefit of the company." The yacht, he said, is actually a fishing boat employed for recreation of key employes and for the entertainment of customers and executives. "At the time the fishing boat was bought, the company disposed of two airplanes which resulted in large savings," he said.

The money alleged to have been spent for personal effects were used to buy anniversary gifts for customers, salesmen and factory supervisors, Mr. Fabel said, while the seashore home was used by convalescent employees and for customers in the summer months. "The monies in question are exceptionally small relative to the resultant benefits to the company," he stated.

In footnotes to Thermoid's annual report, issued late in April, the company disclosed its accounts for the three previous years had been manipulated "for the purpose of diverting profits from the parent companies to the subsidiaries, thereby improperly reducing income and excess profits taxes."

These manipulations, it said, consisted mainly of transfer of materials without charge, charges for materials when no deliveries were made, incorrectly stating quantities transferred and incorrect pricing. The report, signed by two directors, stated that employees of the company had made the initial disclosures. Usually a company's report is signed by either the president or chairman, or both.

At the time the annual report was published, one of the directors said there was no evidence of personal gain from the disclosures but because the investigation was still incomplete, it was thought best that two directors not a part of management should sign the report.

In the preliminary proxy material filed with the S.E.C. for the purpose of electing a new slate of directors, Raphael L. Elias, New York attorney and secretary of the minority stockholders committee, charged that the disclosures contained in the company's annual report demonstrated that Thermoid's present officers "are not the type of people who should be entrusted with running a multi-million dollar, publically-owned corporation."

Mr. Elias identified the committee members as Lawrence A. Harris, Long Island; Fred F. Schroeter, Jamaica, and George G. Summers, of Chevy Chase, Md. Mr. Summers, a Washington attorney, says the material filed with the S.E.C. includes the names of five proposed new directors. Names of four more will be listed later.

Mr. Summers declined to name the proposed directors until the material is cleared by the S.E.C. He said, however, all five "are very reputable people, one being with one of the big steel companies and others being financial people."

Annual Stockholders' Meeting

The new slate will be proposed at the Trenton, N. J., firm's annual stockholders' meeting, the date of which has been a matter of contention since May 2, shortly after the annual report was issued with its disclosures of "irregularities."

The Appellate Division of the New Jersey Superior Court in Trenton on June 20, dismissed an appeal by Thermoid from a lower court decision enjoining the company from reconvening its annual meeting until August 2.

The meeting, originally scheduled for May 3, was adjourned for lack of a quorum after the Appellate court stayed the low court's 90-day injunction order and modified it to 60 days. The meeting, thus, was slated for July 6. This stay was vacated by the new decision, however, according to the court clerk, which pushed the meeting back to August 2.

Paul Belmont, attorney for Thermoid, disagreed with this interpretation of the decision, maintaining the July 6 meeting date still stood. He said, however, it would be adjourned at that time, if shareholders agree, until about August 1 to enable the company to report to stockholders on the parties who sought the delay for study of the annual report, issued April 25.

SOUTH FLORIDA TEST SERVICE CONSTRUCTS NEW LABORATORY ANNEX

South Florida Test Service, Miami, Fla., has announced the construction of a new laboratory annex building (shown above) adjacent to its present main inland proving grounds, laboratory and office buildings. In connection with the new building, which contains 3,000 square feet of floor space, the company is constructing an auxiliary test field of 75,000 square feet for added exposure rack facilities. With this new addition, the firm will have approximately 180,000 square feet of land being used for inland weathering, corrosion and sunlight exposure tests. The company also has locations directly on the ocean for salt atmospheric and sea water immersion tests. Next year, South Florida Test Service will celebrate its twenty-fifth anniversary. The company plans a formal opening of its new facilities at that time.

SPERBERG FORMS NEW COMPANY FOR INDEPENDENT TIRE TESTS

Lawrence R. "Larry" Sperberg, until recently associated with the Sid Richardson Carbon Co. and previously with the J. M. Huber Corporation, has announced the formation of the Three-T-Fleet (Texas Tire Testers) at Odessa, Texas. The new company is offering an independent tire testing service, and its operating vehicles will cover the territory from Big Springs west to El Paso.

Three-T-Fleet is said to offer a new type of carefully controlled tire test service that up to now has not been available to the rubber industry. This new test, the company states, is an actual trucking operation that has been modified and expanded to include testing of tires as one of its functions. Since the trucks haul a pay cargo, the cost of testing tires is said to be considerably reduced.

Three-T-Fleet trucks have no set speed restrictions. The trucks operate at speeds that conform to normal traffic flow, which in West Texas is substantially higher than in the heavily congested Eastern industrial areas. The loads carried by the vehicles are the maximum legal loads permitted. For a 10.00-20 size truck tire, this corresponds to a load of approximately 110 to 125% of rated capacity.

Vehicles are loaded from 85 to 100% of the time, dependent upon the unloading schedule. Three-T-Fleet vehicles resemble normal fleet test trucks in that they operate over the same routes on a daily basis with the same drivers. Inspection and rotation of tires is made at prescribed intervals.

The following records and measurements are obtained by the company:

(1) Shore Durometer A hardness is measured for each tire (or tread section) at each inspection.

(2) Tread radii of each tire (or tread section) is determined at each inspection.

(3) The non-skid depth is determined at 40 stations around the tire. All grooves, shoulder as well as centerline, are measured. Thus, in a truck tire having four grooves, a total of 4 by 40, or 160 depth measurements, are made on each tire at each inspection.

(4) Section width at the start of the test and at certain specified intervals thereafter may be obtained if desired.

(5) Running temperatures of tires may be obtained if desired.

(6) A daily record of temperature is maintained at the terminal points of each operating vehicle and is reported at the conclusion of each test.

(7) A record of wet miles is kept.

(8) Observations are made on tread cracking at each inspection.

(9) A photographic record is obtained at the end of each test.

(10) Weight measurements may also be obtained if desired and if testing "whole" tires.

Additional information on the Three-T-Fleet operations may be obtained by writing the company.

Any changes in the information submitted for the 1955-56 RUBBER RED BOOK? Notify us today!

COLUMBIAN CARBON ANNOUNCES APPOINTMENTS TO NEW PIGMENT DIVISION

E. B. Brooks

C. O. Davidson

C. A. Polachi

Columbian Carbon Co., New York, N.Y., has announced the formation of a Pigment Division to take over the sales functions formerly handled for the company by Binney & Smith, Inc. The new division assumed its sales activities on July 1. The Pigment Division was organized by Columbian Carbon's acquisition of the staff previously employed by Binney & Smith, Inc., and Binney & Smith International, Inc., on sales of carbon black, iron oxide pigments, dispersions, and other industrial raw materials. The company also acquired facilities for production of carbon black dispersions at Easton, Penna.

Edwin B. Brooks, associated with Binney & Smith for 18 years, most recently as president of Binney & Smith International, has been named general sales manager of the Pigment Division. Enos H. Baker, formerly of Binney & Smith's Akron office, has been named assistant to Mr. Brooks. C. O. Davidson has been named to head domestic sales of the Pigment Division. He will be assisted by John T. Kealy, in charge of iron oxide pigment sales, and Randolph Foster, who heads sales of carbon black and carbon black dispersions to non-rubber consumers. John W. Snyder will head technical service to carbon black consumers in the new sales organization. C. D. Downs will handle technical service on iron oxides as heretofore. Charles A. Polachi has been named to supervise the international business of Columbian Carbon. He has been named a vice-president of Binney & Smith International, Inc., which has become a wholly-owned Columbian Carbon subsidiary.

Agencies and branches previously maintained by Binney & Smith for the sale of Columbian Carbon pigments have been acquired by the latter company and will be operated by their present staffs. Branches affected are located in Akron, Ohio, Boston, Mass., Chicago, Ill., Detroit, Mich., Philadelphia, Penna., and Toronto, Ont., Canada. Agencies that will now represent Columbian Carbon include: Chas. L. Burks & Co., Atlanta, Ga.; Roy A. Ribelin Distributing Co., Dallas and Houston, Texas; Abner Hood Chemical Co., Kansas City, Mo.; Martin, Hoyt & Milne, Inc., Los Angeles and San Francico, Calif., Seattle, Wash., and Portland, Ore.; Wm. B. Tabler Co., Louisville, Ky.; Willard N. Swanson Co., Minneapolis, Minn., and J. E. Niehaus & Co., St. Louis, Mo.

Armaplate Chute Lining

A metal-backed rubber chute lining that can be used as a basic construction material and can be installed on existing or new structures has been placed on the market by the Industrial Products Division of the Goodyear Tire & Rubber Co., Akron, Ohio. Called "Armaplate", the new product consists of abrasive resistant rubber bonded to hot-rolled steel. It can be formed, sawed, sheared, rolled, bent and punched like sheet steel. The new chute lining can be bolted or tack welded. The manufacturer reports the steel-bonded-to-rubber technic gives Armaplate a definite advantage over other chute lining types because no foreign matter can become lodged between the metal and rubber bond. Another advantage is that an operator can use the product as it comes if he wishes, instead of applying rubber lining to a metal chute, hopper or bin. Armaplate is being marketed in four sheet sizes: 48 by 180 inches, 48 by 144 inches, 36 by 180 inches and 36 by 120 inches. The four sheet sizes will be available in four over-all gauges: one-quarter inch, one-half inch, three-quarter inch, and one-inch, including the one-sixteenth inch steel plate.

Rubber Libraries Manual

The Operating Subcommittee of the Rubber Division Library is preparing a manual of procedures for rubber libraries. This manual, which will be made available through the Rubber Division Library, will include chapters on basic library routines such as book selection and order work, classification and cataloging, reference and other information services. There will be an annotated bibliography of basic books and journals, and of technical data series available from various companies and government sources. The committee would welcome suggestions as to specific needs which should be met. They would also appreciate knowing of reference materials which have proved useful in other rubber companies and descriptions of procedures which have been worked out for specific problems within the industry. Ideas and suggestions may be sent to the Rubber Division Library, University of Akron, Akron 4, Ohio, or to Miss Lois Brock, Librarian, General Tire & Rubber Co., Akron 9, Ohio. Copies of a tentative outline of the manual may also be secured on request to Miss Brock.

U. L. ELECTRICAL COUNCIL SPONSORS PANEL MEETING ON BUILDING WIRE

On May 5, 1955, a meeting of the Technical Advisory Panel for Wires and Cables was held at the New York office of Underwriters' Laboratories, Inc. The manufacturers' representatives present were Messers. D. A. Hinton, C. O. Hull, W. T. Peirce, J. N. Reynolds, W. J. Richard, and G. W. Zink. C. J. Krieger was present as a substitute for E. G. Sturdevant. The Laboratories' engineers present were Messrs. D. B. Anderson, H. B. Smith, and C. W. Zimmerer.

The meeting was held for a discussion of a few items relating to rubber-covered wire, including the blistering of neoprene jackets, the corrosion of copper where Butyl rubber is employed, and requirements applicable to a heat-resistant (75°C.) neoprene jacket. An additional item relating to the use of aluminum conductors with Types T and TW wires was also considered. The following, for the record, is a summary of these items as they were discussed at the meeting.

Blistering of Neoprene Jackets

The Laboratories' engineers reported that, as the result of long-time insulation-resistance tests on Type RHW wire at a temperature of 75°C., considerable blistering of neoprene jackets has been observed. A similar condition has also been observed on wires in actual service used in wet locations. The laboratories presented this item for discussion in order to get an opinion regarding the seriousness of this condition, and to ascertain if steps should be taken to establish a requirement regarding blistering.

Comments offered by the manufacturers' representatives were to the effect that most compounds will pass water to some extent, but the question would be to determine whether or not any adverse effect resulted from the passing or absorption of water.

It was pointed out that some compounds —such as those used in fire hose—are given a pricking or perforation treatment by manufacturers in order to provide a certain degree of porosity for the escape of moisture; but the manufacturers felt that this would not be desirable from their standpoint in the case of jacket compounds used on wires.

The discussion led to the conclusion that, while blistering is undesirable from the standpoint of appearance, it does not introduce a hazardous condition: blistering does not adversely affect the operating temperature of the wire nor the protection afforded by the sheath. Blistering might effect the pulling of additional wires into a conduit run, but the manufacturers stated that when additional circuits are required all wires are replaced.

Since the electrical properties of the neoprene covered wire are not adversely affected, and since the sheath is primarily for mechanical protection, the consensus for the present is that no further concern about blistering need be felt, except as the manufacturers consider it to be an appearance problem.

Where Butyl rubber is employed for Type RHW wire, it has been observed that the 60-day test at a temperature of 82°C. has resulted in considerable corrosion of the copper in most cases. The tin or alloy coating on the wire has generally been adversely affected severely or eliminated altogether. It was observed, however, that the corrosion in question did not result in "poisoning" of the rubber compound.

The corrosive effect is due largely to the presence of sulfur in the Butyl-rubber compound, which is introduced to prevent the cure from going too far and to prevent reversion of the compound. Reducing the sulfur content would affect the cure; but there is probably a balance point which can be reached where a reasonably small amount of corrosion would be obtainable with an adequate cure. It was brought out that a coating on the conductor will not ordinarily stop corrosion (if the Butyl rubber contains an excessive amount of sulfur) unless there is a fairly heavy amount of tin.

It was felt by the Laboratories' engineers that a corrosion test is in prospect if this condition is not improved—and this test would be on the rubber compound to determine its corrosive effect. The problem is considered to be serious and the industry as a whole should work on its solution. The manufacturers' representatives present at the meeting agreed to check into the problem and to report subsequently the results of their investigations to the Laboratories.

Type RHW Wire Jackets

The meeting discussed the subject of requirements for a 75°C. neoprene compound to be employed on Types RH and RHW wires and in service cables. In this connection, reference was made to the Laboratories' letter of March 22, in which a proposal was set forth for the phyical properties of a neoprene sheath compound for use on Type USE service cable. The Laboratories had taken the position that since Types RH and RHW are wires having a 75°C. temperature rating, the neoprene used for sheaths (in lieu of braids) should also be capable of passing tests for a 75°C. compound.

Several of the manufacturers' representatives indicated that a satisfactory compound which has been used has been in accordance with ASTM Specification D752. This, the Laboratories pointed out, would not necessarily be a 75°C. compound; but it was further pointed out that practically all of the sheath compounds tested at the Laboratories' Chicago office in connection with countercheck work have passed tests for a 75°C. compound. The manufacturers' representatives also felt quite strongly that it would be very desirable to have a single set of requirements applying to the 75°C. neoprene sheaths for Types RH and RHW conductors as well as the sheath on Type USE service cable.

On the basis of the foregoing, the discussion reached a point where there was a consensus that a requirement for a 75°C. neoprene sheath should be proposed to the industry, as follows: the physical properties, before and after accelerated aging, would be required to be the same as those specified for Class 16 neoprene in the Laboratories' Standard for Flexible Cord and Fixture Wire, except that the original tensile strength would be 1800 instead of 1500 pounds per square inch, and the elongation after the oxygen-pressure and air-pressure heat tests would be a flat minimum of 200% instead of 50% of original. This will be presented in due course to all of the manufacturers of labeled rubber-covered wires.

Dismuke Tire Reorganized

The Dismuke Tire and Rubber Co., employing 115 persons and doing a business of $3,500,000 a year, has been leased to a new concern for a 90 day period, it was announced on May 6th. The new organization will work under the name of Dismuke Rubber Manufacturing Co. The company will operate as a wholly-owned subsidiary of the Mansfield Tire & Rubber Co., of Mansfield, Ohio. It is contemplated that within the 90 day period the Mansfield Co. will acquire the business. Meanwhile the plant has shut down operations for conversion. A. E. Barkett, assistant to the president of Mansfield, will be in charge of the new organization. Other officers are J. W. Torti, treasurer, and Semmes Luckett, secretary. The Dismuke factory was constructed in 1947 under the management of W. O. Dismuke, and started manufacturing in 1948.

Albert Gains New Firm

Sydney L. Albert has gained controlling interest in Standard Industries, Inc., of Scranton, Penna., according to a recent announcement. Mr. Albert received 200,000 shares of Standard stock in exchange for the New Bremen Rubber Co. at New Bremen, Ohio. The latter is the former Seiberling Latex Products Co. Standard stock has been quoted at $5.00 a share on the American Stock Exchange. Mr. Albert paid about $565,000 for 98% of the latex firm's stock in February, 1953. Last February he gained control of the Bellanca Aircraft Corp. of New Castle, Del., in a similar transaction. At that time he traded the business and inventory of his general partnership, L. Albert & Son of Akron, rubber and plastic machinery dealers, to Bellanca. In return he received 1,071,250 shares of Bellanca common or about 82% of all outstanding stock.

General Tire Promotes Pfau

Appointment of Emert S. Pfau as technical director of the Chemical Division of the General Tire & Rubber Co., Akron, Ohio, was recently announced. In his new post, Mr. Pfau will serve to coordinate technical activities not only within the division itself but also between the Chemical Division and other division of the company. Mr. Pfau formerly headed up the polymerization group of the Research Division of General Tire. Prior to that he did chemical research work for another rubber company and, at one time, served as laboratory technician for Lever Brothers Co. A native of Chicago, Ill., Mr. Pfau took a bachelor of science degree at the University of Chicago. He also attended the University of Akron evening school.

HIGH POLYMER CONFERENCE SET AT UNIVERSITY OF MICHIGAN

The Department of Chemical and Metallurgical Engineering of the University of Michigan, Ann Arbor, Mich., has announced that an open research conference will be held on July 25 and 26 to survey the recent research and current thinking regarding the effects of molecular structure and molecular association upon the properties of high polymers. The research papers and discussions will deal with some of the areas covered by an intensive course on properties and structures of high polymers in solution which will be offered by the University on July 18 to 23, preceding the research conference.

Other subjects will also be discussed at the July 25-26 conference, such as the dynamic properties of concentrated solutions, degradation of linear and branched polymers, crosslinking by atomic radiation, etc. A registration fee of $3.00 has been set for the research conference. Additional information may be obtained from Lindsay M. Hobbs, 2028 East Engineering Building, University of Michigan, Ann Arbor, Mich. The conference papers follow:

"Creep and Creep Fracture Properties of Semicrystalline Polymers", by Chester G. Bragaw, Jr. (DuPont).

"Structure of Polyethylene by Infrared Absorption" by William Bryan (DuPont).

"Molecular Structure and Strength Properties of Plastics" by Rolf Buchdahl (Monsanto).

"The Tensile Strength of Plastics Above Tg" and "Viscosity and Shear Rate Effects for Coiling Polymers" by F. Bueche (University of Wyoming).

"Polymerization-Depolymerization Equilibrium in Polymethyl Methacrylate" by S. Bywater (Canadian National Research Council).

"Effects of Rates of Shear Upon Viscosity Measurements" by M. A. Golub (Goodrich).

"Turbidity of Colloidal Solutions" and "Remarks on Interpretation, Evaluation and Extrapolation of Viscosity Data in Polymer Solutions" by Wilfried Heller (Wayne University).

"Viscosity of Dilute Polyvinyl Acetate Solutions" by L. M. Hobbs (University of Michigan).

Ultrasonic Degradation of High Polymers" by H. H. G. Jellinek (Corps of Engineers, U. S. Army).

"An Engineer's View of Nuclear Energy" by D. L. Katz (University of Michigan).

"Some Recent Applications of Light Scattering to the Study of Polymer Configuration" by W. R. Krigbaum (Duke University).

"Infrared of Polytetrafluoroethylene" by Samuel Krimm (University of Michigan).

"Absolute Turbidity Measurements, Two Sources of Systematic Error" by H. F. Mason and B. S. Garrett (Rohm and Haas).

"The Limiting Viscosity Behavior of Dilute Polyelectrolyte Solutions" by R. A. Mock (Dow Chemical).

"Molecular Association of Polymers in Nonaqueous Media" by Herbert Morawetz (Polytechnic Institute of Brooklyn).

"End Group Measurements of Polybutadiene and Polystyrene Modified with bis-type Compounds" by R. M. Pierson (Goodyear).

"Depolymerization of Linear and Branched Chain Molecules" by Robert Simha (New York University).

"The Tensile Strength of Elastomers" by G. R. Taylor (Mellon Institute).

"Mechanism of Degradation and Cross-Linking of Polymers" by L. A. Wall (National Bureau of Standards).

"Mechanisms Affecting the Viscosities of Moderately Concentrated Polymer Solutions" by S. G. Weissberg (National Bureau of Standards) and Robert Simha (New York University).

EBERS, SCHOENE AND CHITTENDEN PROMOTED BY NAUGATUCK CHEMICAL

E. S. Ebers

D. L. Schoene

F. D. Chittenden

Three major organizational changes in the sales, production and development departments of the Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn., were recently announced. Earle S. Ebers, formerly director of research and development, has been named general sales manager for the division. D. Lorin Schoene, formerly assistant director of research and development, has been named director of research and development. F. Dudley Chittenden, previously factory manager of the division's Painesville, Ohio, plant, has been named production manager for the division. At the same time, it was announced that Robert E. Casey, formerly general sales manager, has been appointed marketing coordinator for the division, and C. H. Madsen, formerly production manager, has been named product manager for chemicals and explosives on the administrative staff of the general manager of the division.

Mr. Ebers received his degree in chemistry from Dalhousie University and his doctorate at Harvard. He joined U. S. Rubber in 1937 as a chemist in the company's central research laboratories in Passaic, N. J. He was named director of research and development for Naugatuck Chemical in 1953. Mr. Schoene received his doctorate in chemistry from Iowa State College. He joined U. S. Rubber in 1939 as a chemist in the central research laboratories, and was named assistant director of research and development in 1953. Mr. Chittenden joined U. S. Rubber in 1926 as a chemist at the central research laboratories after receiving his doctorate in chemistry from Yale University. He was named factory manager of the Painesville plant in 1950.

Shell Chemical Names Wolff

H. I. Wolff has been named to the newly created post of assistant manager of the manufacturing and development departments of the Shell Chemical Corp., New York, N. Y. The new position was established because of broadening company activities resulting from acquisition of butadiene, styrene, and copolymer facilities at Torrance, Calif. Mr. Wolff will be responsible for the coordination and guidance of plant improvement and expansion programs. He will also supervise process evaluation and design of new products and processes.

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3M Assigns New Positions

Minnesota Mining and Manufacturing Co., St. Paul, Minn., has announced that three of its vice-presidents have been assigned expanded responsibilities. Clarence B. Sampair has been placed in charge of the tape and ribbon products group. This group is composed of the cellophane, fibrous and industrial tape divisions, the ribbon division, and the Mid-States Gummed Paper Co., a 3M subsidiary. Joseph C. Duke, who has been vice-president in charge of coated abrasives and related products, also assumes responsibility for the Adhesives and Coatings Division. Hubert J. Tierney has been named to head the newly-formed Plastic Division. This division guides research, manufacturing and sales of the company's newly-developed reinforced plastic sheeting and reinforced plastic pipe. In addition, Mr. Tierney was named chairman of a newly-created tape planning committee.

Multi-Purpose Release Agent

Axel Plastic Research Laboratories, New York, N. Y., has introduced a new mold release agent said to be the most important advance in this field since the first use of silicones. Called "Mold-Wiz," the product coats all types of molds forming a hard mirror-like finish that resists the tendency of rubber, metal and plastics to adhere to the mold. Mold-Wiz is non-corrosive, non-toxic and non-explosive and does not interfere with plating or painting of cast materials, the company states.

I.C.C.R.I. ANNUAL MEETING HELD ON MAY 11 IN DELFT

The annual meeting of the International Committee for the Classification of Rubber Information (I.C.C.R.I.) was held this year on May 11 at the Rubber-Stichting in Delft, Holland. The meeting was attended by delegates of the Research Association of British Rubber Manufacturers, Institut Francais du Caoutchouc, and Rubber-Stichting.

The general purpose of the meeting was to adapt the use of the well-known Dawson Classification to the latest developments in the rubber industry and to discuss the problems involved in preparing abstracts from patents and literature data. During the meeting, various modifications of the Dawson Code suggested by different representatives were discused and unanimously adopted.

The most important subject under discussion was the alphabetical index of the Dawson Code to be drawn up by R.A.B.R.M. and which will be published in the near future. The index will greatly help to facilitate the use of the Code and thus, foster its acceptance.

At the same time, a meeting was held by members of the International Educational Committee. This meeting was attended by representatives of Austria, Great Britain, France, Germany, Indonesia and the Netherlands, together with observers from Argentina and Germany. The United Kingdom was represented by G. E. Holmes-Siedel.

This committee is in charge of international professional education in the field of rubber and "keeps an eye" on the award of internationally recognized certificates. The results obtained in 1954 were discussed at the meeting, while the directives for the 1955 examination were outlined.

Announce Proposal to Merge

R. C. Ingersoll, president of the Borg-Warner Corp., Chicago, Ill., and E. S. Dulin, president of the Byron Jackson Co., Los Angeles, Calif., have announced that after negotiating for some time they have agreed and will recommend to their respective boards of directors that the two companies merge. Mr. Dulin has also agreed to recommend that Byron Jackson shareholders approve the plan of merger. The merger is to be accomplished on the basis of four shares of Borg-Warner for five shares of Byron Jackson. The PB Division of the Byron Jackson Co. is a producer of flooring and oil well specialties. The Marbon Chemical Division of Borg-Warner produces solvent cements, high-styrene butadiene copolymers, and synthetic resins. The announcement pointed out that the completion of the proposed merger would afford additional diversification to Borg-Warner's growing fields of industrial activity. When merged, the Byron Jackson Co., established in 1872, will continue to operate as an independent operating unit with no change in management, personnel or policy.

Any changes in the information submitted for the 1955-56 RUBBER RED BOOK? Notify us today!

Produces 650,000,000th Tire

What is said to be a new world's record for number of tires built by a single firm was set recently by the Goodyear Tire & Rubber Co., when its 650,000,000th pneumatic unit—a tubeless truck tire—rolled off the production line. The symbolic milestone tire was presented to P. W. Litchfield, Goodyear chairman, whose 55 years with the company have spanned nearly all of this tremendous tire production. The tubeless truck tire held special significance for Mr. Litchfield. Back in 1903, as factory superintendent, he obtained a patent on a tubeless tire which he designed. Reflecting upon the vast number of tires which the company has turned out, the chairman observed that the latest 25,000,000 were produced in only nine months—in sharp contrast to the firm's first 25,000,000, which required 17 years to build. Further illustrating the rapid climb in tire production over the years, he drew another comparison. Up until World War II—a span of some 40 years—total number of tires manufactured by Goodyear amounted to only one half the current total, the other half being produced in the past 14 years, according to Mr. Litchfield.

Appointed U. S. Distributors

C. J. Osborn Co., New York, N. Y., has been appointed exclusive distributor for the Sachtleben Co., Cologne, Germany (Western Zone), producers of pure zinc sulphide, 60% concentrated zinc sulphide, and precipitated blanc fixe. Sachtleben has been established for 77 years and presently is an outstanding producer of these products on the continent. Considerable research and development has been done in recent years on utilization of these extremely fine white pigments into new types of plastics, rubber products, coated papers, printing inks, and emulsion-type paints. C. J. Osborn, established in 1889, maintains modern laboratory facilities at Linden, N. J.

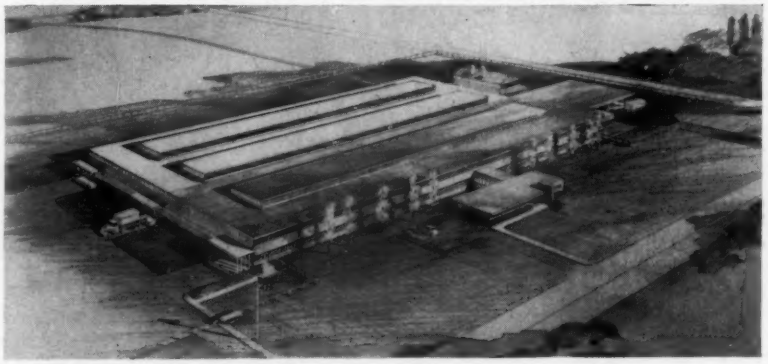
Royal Flotation Tractor Tire

Particularly suited for use in citrus growing areas where tractors must have flotation to keep from digging deeply into the soil is a new "U. S. Royal Flotation Special" tractor tire just announced by the U. S. Rubber Co. In certain soils, such as dry sand or volcanic ash, tractors and self-propelled harvesting equipment need tires that will stay on top of the soil rather than those that dig in. These soils are common in the raising of citrus fruits and in certain other types of fruit orchards. An ordinary tractor tire will make tracks too deep, and may lead to soil erosion and retarding tree and plant growth, company officials state. "There is an unusual tread design in this tire, which includes staggered blocks to give moderate traction, self-cleaning action and uniform wear", says H. C. Oliver, sales manager for U. S. Tires. "This design carries down into the sidewall of the tire to give traction in soft ground. The tread has long life even under highly abrasive soil conditions. As this flotation tire rolls, the thin, flexible center section of the tread cups upward so that soil in the center of the 'footprint' buoys up the tire. In this way, tire tracks are kept shallow", Mr. Oliver explains. The U. S. Royal Flotation Special is made in sizes 13-26 and 14-26 in 6-ply construction.

Chardon Rubber Maps Expansion

Chardon Rubber Co. of Chardon, Ohio, has announced plans for the construction of new buildings to contain 100,000 square feet of floor space. In addition, all machinery and equipment in the present plant is being revised or replaced with the latest modern design. The expansion program will cost approximately $3,000,000, company officials stated. Chardon Rubber, which became a subsidiary of the Ball Brothers Co., in 1954, will manufacture all rubber products formerly produced by Ball at Muncie, Ind.

U.S. RUBBER ANNOUNCES EXPANSION OF SANTA ANA FOAM RUBBER PLANT



U. S. Rubber Co. has announced plans to double the size of its foam rubber plant in Santa Ana, Calif., to permit the manufacture of foam rubber mattresses on the West Coast and to permit expanded production of foam cushioning for furniture. The original plant, opened in June, 1954 with 87,000 square feet of floor space, is shown in the shaded area of the architect's drawing above. The planned addition, shown in the white area, will contain 89,920 square feet of floor space. Construction of the addition was to have begun in June. The addition to the Santa Ana plant will be the seventh major expansion for the manufacture of Koylon foam since World War II. The company presently operates two other foam rubber plants—one at Mishawaka, Ind., and the other in Woonsocket, R. I.

U.S. ASKS SUMMARY JUDGMENT IN QUANTITY DISCOUNT CASE

The U. S. Government, on May 11, asked the Federal District Court in Washington, D. C., for a summary judgment dismissing a suit by major rubber manufacturers to block a Federal Trade Commission order limiting price discounts on large sales of tires and tubes. In the summer of 1947, following complaints by small business interests that quantity discounts on tires and tubes constituted price discrimination in favor of large purchasers, FTC instituted proceedings against large manufacturers.

On November 20, 1951, the commission issued an order limiting to a carload, or 20,000 pounds, the quantity of tires or tubes on which a discount could be given when sold in one consignment to a single dealer. It prohibited larger discounts for larger purchases. Twenty or more manufacturers and distributors of tires and tubes filed suit to enjoin enforcement of the FTC order.

Among the parties to the suit were Goodyear, Goodrich, Firestone, U. S. Rubber, Seiberling, Kelly-Springfield, Montgomery Ward, American Oil Co. and other large makers or sellers of tires and tubes. The suit was the first court case brought to test the "quantity limit" proviso of the Robinson-Patman Act.

The Department of Justice, acting for the FTC, moved on May 11 for dismissal of the suit. The government claimed that no genuine issue was involved and that it was entitled as a matter of law to a summary judgment. Arguments on the motion were to have begun on June 10.

Meanwhile, the quantity limit proviso is in legislative controversy. The Attorney General's National Committee to Study the Anti-Trust Laws recommended its repeal. Small business spokesmen who have testified at Congressional hearings on the committee's report have opposed the recommendation. Their contention was that if the quantity limit section were removed from the law it would open the way for price cutting by the large companies that could drive smaller concerns out of business.

Poly-Sperse Processing Aids

National Polychemicals, Inc., Wilmington, Mass., has announced "Poly-Sperse AP-300" and "AP-400," specially designed rubber processing aids which are said to speed up the mixing cycle and maintain a high level of hardness and stiffness in the vulcanizate. By the use of these products, stocks containing high filler loadings which would be extremely difficult to mix may be handled with comparative ease, the firm states. Compounds with relatively small amounts of Poly-Sperse AP-300 and AP-400 exhibit definitely lower Mooney plasticity values. Dispersion of compounding ingredients is facilitated by the use of Poly-Sperse. The new materials also have a mild activating action, making possible a downward adjustment in acceleration in some cases. The action of both of these products is fundamentally the same. However, Poly-Sperse AP-300 imparts higher hardness and stiffness to the cured stock. Poly-Sperse AP-400, on the other hand, is somewhat lower in cost.

DUPONT ELASTOMERS DIVISION ANNOUNCES TWO SALES PROMOTIONS

W. V. Sauter, Jr.

R. Scotton Griffin

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced that William V. Sauter, Jr., for the past two years technical development representative for the Wilmington district office, has been named to the newly-created post of assistant sales manager for neoprene. R. Scotton Griffin, formerly technical sales representative in the Boston, Mass., office, has been named to succeed Mr. Sauter as promotional sales representative in Wilmington.

Mr. Sauter received his bachelor of chemistry degree in 1936 and a chemical engineering degree in 1937, both from Cornell University. Following graduation, he joined DuPont as an analyst at the Jackson laboratory, Deepwater Point, N. J. Following Navy service during the war, Mr. Sauter joined the company's Rubber Chemicals Division (now Elastomers Division) in the sales promotion section at Wilmington. Two years later, he became a compounder at the rubber laboratory at Deepwater Point, and in 1949 was assigned to the Akron district as technical sales representative. He returned to Wilmington in technical development work in 1953.

Mr. Griffin was graduated from Cornell University in 1946 with a B.S. degree in electrical engineering. He joined DuPont the same year as a compounder at Deepwater Point, and in 1949 transferred to Wilmington for assignment to the neoprene sales promotion and development section. In 1951, he joined the Boston office staff. Mr. Griffin is the author of several papers on rubber technology, and has been active in the Division of Rubber Chemistry, A. C. S.

Rubber Flooring Sales Rise

Sales of rubber flooring during the first quarter of 1955 are up 5% over the same period last year, according to an announcement by the Rubber Flooring Division of the Rubber Manufacturers Association, New York, N. Y. Rubber flooring has increased steadily during the past decade, present volume having reached more than 16 times the pre-war figure. "The rapidly growing trend to resilient floor coverings throughout the home is probably responsible, in large measure, for the increase in rubber flooring sales," said C. P. McFadden, chairman of the R. M. A. Rubber Flooring Division. "The post-war boom in commercial and institutional building has also been a significant factor in this growth. Rubber flooring has always been in demand for hospitals, schools, and public buildings and the high level of construction in this field has been reflected in our sales picture. R. M. A. members are optimistic about the future," Mr. McFadden said. "In the light of past and present gains, we are confident that 1955 sales of rubber flooring will be substantially above those of 1954."

Rohm & Haas, Philadelphia, Penna., has announced a reduction of 4c per pound for ethyl acrylate monomer and 1c per pound for methyl acrylate monomer.

Goodyear To Offer Common

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., Akron, Ohio, announced on June 14 that the company's board of directors have decided to raise additional capital funds through the sale of common stock. This will take the form of an offering to holders of Goodyear common stock of an opportunity to subscribe for additional common stock in the ratio of one new share for each ten shares held. The subscription price will be determined shortly prior to the offering, and is expected to provide in the area of $50,000,000 of additional capital funds. The proceeds from the issue will be used partly for the company's program of capital expenditures and partly for working capital. The offering will probably be underwritten by a large syndicate headed by Dillon, Read & Co. of New York.

Ecuadorean Tire Plant Set

Bellanca Aircraft Corp., through its Albert & Son Rubber Mill Machinery Division, has completed negotiations for the construction of a $1,600,000 tire plant in Cuenca, Ecuador. The new plant, with an initial daily capacity of approximately 200 tires and tubes will be completed this year. The new plant will be the only producer of tires and tubes in Ecuador.

ADDITIONAL PLANS ANNOUNCED FOR FRENCH BUTYL FACILITY

France's Butyl rubber project, preparations for which have been going on for about three years, is getting under way with the formation of a new company. The group of tire manufacturers, oil refining companies, and chemical enterprises which formed the Syndicat d'Etudes du Butyl-Rubber has now organized Société du Caoutchouc Butyl (SOCABU), with an initial capital of about $3,000,000. Firms concerned are Kléber-Colombes, Dunlop, Michelin, Cia. Francaise de Raffinage, Esso-Standard, Manufactures de Produits Chimiques du Nord, Kuhlmann, Rhône-Poulenc, Bozel-Malétra, Pechiney, and Ugine.

A plant will be built near Rouen, one of the principal oil refining centers in France, with a capacity of 44,000,000 pounds. According to the findings of the study group, it is possible to produce Butyl rubber in France from refinery gases at competitive prices, but considerable capital will be required. Originally, it was estimated that about $13,000,000 would be needed, but alterations to earlier plans and changes in building costs have brought the amount of investment necessary to about twice this figure. Participation of a number of strong groups in various industries and the promise of assistance from government will, however, help to solve the financial problem.

Final production envisaged represents double that of earlier plans, and will be in excess of French requirements. Presently, France imports from the United States what Butyl is necessary for its own production. Part of the excess production from the new Butyl plant will be placed in other European markets.

Feasibility of the French plan rests on the fact that the country has a large and efficient oil refining industry. Proposals for an alcohol-based synthetic rubber industry were turned down by the government as uneconomic. Annual throughput of the refiners is about 25,000,000 short tons of crude. Chemical utilization of refinery by-products has been carried out on a substantial scale at several centers for some years. S. A. Naphthachimie, in which Pechiney and Kuhlmann cooperate with British Petroleum (formerly Anglo-Iranian Oil), is producing a number of organic chemicals from oil-derived ethylene and propylene at Lavera, near Marseilles.

St. Gobain is cooperating with Shell in a petroleum chemicals plant at Berre near Marseilles, in which acetone and isopropyl alcohol are the principal products. Société Shell-St. Gobain also operates a petroleum chemicals plant near Rouen, chiefly for the production of synthetic detergents. Petroleum derivaties play an important part in the production of synthetic phenol and acetone in France, Rhone-Poulenc being the principal producer.

The Industrial Products Division of B. F. Goodrich has published a new data sheet on "Plastisols (liquid vinyl plastics)." The data sheet is available upon request to the company.

DuPont Promotes Holbrook

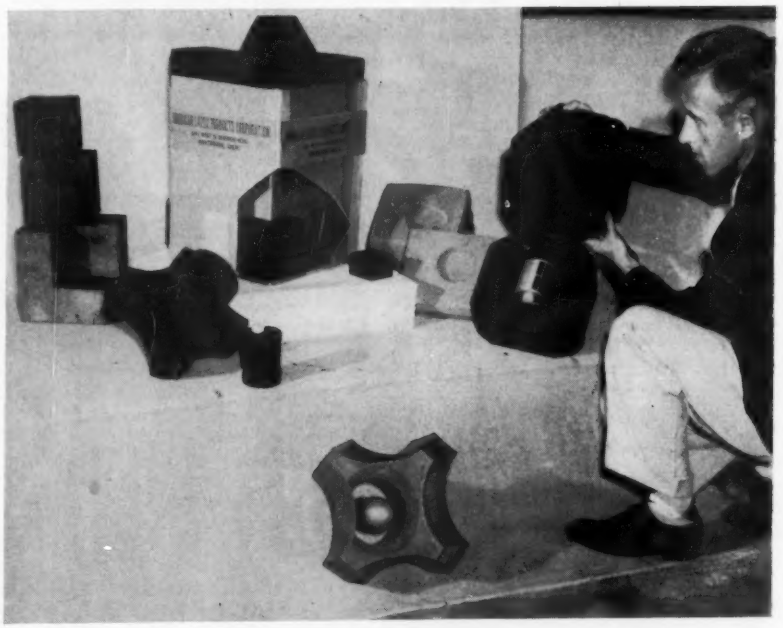
Dr. George E. Holbrook, formerly assistant director of the Development Department of E. I. du Pont de Nemours & Co., Inc., has been named assistant general manager of the company's Organic Chemicals Department. He succeeds Samuel Lenher who has been elected a director, vice-president and member of the company's Executive Committee. Dr. Holbrook has spent all but the last four years of his 22-year DuPont career in various capacities in the Organic Chemicals Department. Joining the company in 1933 as a research chemist at Jackson Laboratory, Deepwater Point, N. J., Dr. Holbrook was named head of the New Products Division in 1938 and assistant director of the Jackson Laboratory in 1943. From January to September, 1949, he served as general superintendent of development at the company's Chambers Works and then was transferred to Wilmington where he served successively as assistant director of the Organic Chemicals Department's Technical Division and departmental engineer. He became manager of the plant's development section in 1950. He was transferred to the Development Department and appointed assistant director in 1951.

Dr. Holbrook, given leave from the company on April 1, 1952, became deputy director, Chemical Division, Chemical, Rubber and Forest Products Bureau of the National Production Authority, subsequently advancing to director. He returned to DuPont and resumed his duties as assistant director of the Development Department in November, 1952. He is also a director of Du Pont Co. of Canada, Ltd., and Du Pont of Canada Securities, Ltd. Born March 4, 1909, at St. Louis, Mo., Dr. Holbrook attended the University of Michigan where he received his bachelor of science degree in 1931, master of science degree in 1932, and Ph.D. in 1933, all in chemical engineering. Dr. Holbrook is a director of the American Institute of Chemical Engineers and in 1953 received its Professional Progress Award.

Enjay Opens Akron Office

Enjay Co. Inc., New York, N. Y., has opened a district office at 11 S. Portage Path, Akron, Ohio, to provide sales and technical services to customers for Butyl rubber in the Middle West. General manager of the Akron office is H. C. Evans, who comes to Akron from Tulsa, Oklahoma. Also on the sales staff of the Akron office is T. C. Jones.

PRE-FORMED FOAM RUBBER "MOLTEX" PACKAGES REDUCE SHIPPING LOSSES



American Latex Products Corp., Hawthorne, Calif., one of the nation's largest producers of foam rubber mattresses and foam rubber components for the furniture and aviation industries, has entered into large-scale operations for the salvage of scrap and waste foam rubber. This scrap is ground to sawdust size in a hammer mill, mixed with a small amount of liquid latex, packed in molds of the appropriate shape, then cured into pre-formed packages, packaging units, and rubber slabs as shown in the photograph above. This salvage product is called "Moltex," and the packages made from it are finding use in the shipment of delicate parts that must avoid rough handling during transit. The Moltex corner blocks shown at the far left and in the cutaway box are used for literally "floating" one package or crate inside another on foam rubber cushioning. The round package with the radiating splines (the mold used to form it is shown in the foreground) and the package being demonstrated are used for shipping delicate aircraft accelerometers. The square package (center background) is used for shipping fragile aircraft radar sensor units.

FINAL 1954 AWARD WINNERS ANNOUNCED BY SAFETY COUNCIL

The National Safety Council, Chicago, Ill., has announced the final 1954 results of the Rubber Section Safety Contest. In Division I, covering those plants working over 400,000 monthly man-hours, the Mishawaka, Ind., plant of the U. S. Rubber Co. took first place with an accident frequeny rate of .18. The Gadsden, Ala., plant of the Goodyear Tire & Rubber Co. took second place with a score of .32, and Akron Plant No. 1 of the Firestone Tire & Rubber Co. took third place with .59. The average accident frequency rate for Division I in 1954 was 2.11.

In Division II, covering those plants working 200,001 to 400,000 monthly man-hours, Goodyear's Jackson, Mich., plant came in first with a score of .38. Firestone's Des Moines, Iowa, plant was second with .97, and the same company's plant in Bombay, India came in third with a score of 1.02. The average accident frequency rate of Division II in 1954 was 3.32.

Division III, covering those plants working 100,001 to 200,000 monthly man-hours, saw Goodyear's Plant No. 2 in Akron come in first with an accident frequency rate of .48. The Electric Hose & Rubber Co., Wilmington, Del., came in second with a score of .62. Close behind came Goodyear's plant in Sweden with a score of .69. The average accident frequency rate of Division III in 1954 was 7.35.

Division IV covers those plants working 50,001 to 100,000 monthy man-hours. In this division, Goodyear's New Bedford, Mass., plant, Goodrich Chemical's Port Neches, Texas, plant, and Naugatuck Chemical's plant at Port Neches all came in with a perfect score. As a matter of fact, six plants tied for first place, all with a perfect score, the others being the Goodyear plant at Houston, Texas, the Kentucky Synthetic Rubber Corp. plant at Louisville, Ky. (now owned by American Synthetic Rubber Corp.), and the Baton Rouge, La., plant of the Copolymer Corp. The average accident frequency rate of Division IV in 1954 was 4.71.

Division V covers those plants working less than 50,000 monthly man-hours. Seventeen plants in this division had perfect scores, while the average accident frequency rate for the division as a whole in 1954 was 9.89.

La Crosse Sets Safety Record

The La Crosse Rubber Mills Co., La Crosse, Wisc., has won special recognition from its compensation insurance carrier because of its far better than average rate of only 2.2 accidents per 1,000,000 man hours of operation. During a special ceremony held at the plant, Albert P. Funk, Jr., president of the La Crosse firm, accepted an engraved plaque from Harvey Lillemon, La Crosse safety engineer for Employers Mutuals of Wausau, Wisconsin. According to Mr. Lillemon, La Crosse enjoys excellent co-operation on the part of all employees, the active participation of company foremen and superintendents, and an enthusiastic safety committee—all of which had a great deal to do with setting the notable safety record.

TYER RUBBER ANNOUNCES ELECTION OF TWO NEW VICE-PRESIDENTS

F. J. Emmett

K. C. Bevan

Tyer Rubber Co., Andover, Mass., has announced the election of Franklyn J. Emmett as vice-president in charge of sales, and Kenneth C. Bevan, as vice-president in charge of manufacturing. Mr. Emmett, formerly with the International Shoe Co., has been with Tyer Rubber for almost four years. During most of this period he served as sales manager of the Footwear Division. Earlier this year, he was promoted to general sales manager for the entire company. Mr. Bevan, formerly with the U. S. Rubber Co., has been associated with Tyer Rubber for over seventeen years. He has been active in the Society for the Advancement of Management in Boston, Mass., having served as president and a director. The company has also announced the election of Gordon L. Colquhoun as assistant treasurer. Mr. Colquhoun, formerly with the Andover National Bank, has been with Tyer Rubber since 1942 serving as office manager and comptroller of the company.

Named Midland Division Manager

Dow Chemical Co., Midland, Mich., has appointed Dr. William H. Schuette general manager of its Midland Division. Dr. Schuette, assistant to the general manager since January 1, in his new post will assume administrative direction of the division. Dr. Mark E. Putnam, Dow Chemical executive vice-president, who has handled the functions of division general manager, will now assume company-wide responsibilities. Dr. Schuette had been plastics production manager for three years prior to his appointment as assistant to the general manager. He began his Dow career in the company's chemical engineering laboratory in 1941. A few months later he moved to styrene monomer production. He had been assistant production manager of "Styron" plastic for three years when he was named to head plastics production in 1952.

Vernay Laboratories Expanding

Vernay Laboratories, Inc., Yellow Springs, Ohio, has announced that a 3,000 square foot addition to its plant is nearing completion and will be ready for use by July 15. The expansion program was made necessary by increased sales which, so far in 1955, have been running 50% higher than in the corresponding period of 1954. Vernay Laboratories recently concluded an agreement with the IUE-CIO, calling for a straight-time wage increase of 7c per hour plus supplementary fringe benefits at an estimated additional cost of 3c per hour.

New Anti-Foaming Agent

Development of a new silicone anti-foam agent that combines the high efficiency of the silicones with greatly improved ease of use in manufacturing operations has been announced by the Silicone Products Department of the General Electric Co., Waterford, N. Y. Dr. Charles E. Reed, department general manager, said that the new defoamer represents a significant advance over conventional silicone defoamers, due to its ease and versatility of application in a broad cross section of industries plagued with costly foaming problems. Designated "Anti-Foam 60," the low-viscosity silicone emulsion has been designed specifically for use in aqueous foaming systems. Major advantage claimed for Anti-Foam 60 is that it eliminates costly handling problems that have been associated with the use of conventional viscous, paste type silicone antifoam agents in manufacturing operations.

Georgia Marble Names Tate

William B. Tate, Jr., has been appointed sales manager of the Calcium Products Division of the Georgia Marble Co., Tate, Ga. Mr. Tate has had wide experience in all fields where crushed and ground limestone are used. Ashton E. Garner, formerly sales manager of the Calcium Products Division, has resigned to enter business for himself. In his new capacity, Mr. Garner will represent the Calcium Products Division in the State of Florida in the sale of certain of its products.

Licenses Reclaimator Process

U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y., has licensed the Fabrica Argentina de Alpargatas of Buenos Aires, Argentina, to use its exclusive "Reclaimator" process. In addition to the quality factors of the reclaim, such as high abrasion resistance, excellent aging and low heat build-up, there are distinct processing advantages such as lower power requirements in mixing and faster mixing, it is reported. The process is a comparatively simple means for producing reclaimed rubber. It is continuous and requires no steam plant and no washing or drying operations. There is little stock in process at any given time, which makes it simple to change stocks and to shut down and start up without days of preparation. The process reduces the manufacturing cycle from 24 hours to 24 minutes. Since no large quantities of intermediate partially processed materials have to be stored, it is relatively easy to maintain a clean plant, U. S. Rubber Reclaiming states. The process is easily adapted to the production of powdered reclaim or extruded reclaim, particular advantages to the Alpargatas Co.

The Alpargatas Co. is the first to be granted use rights on the process patent. Alpargatas is the largest employer in the Argentine with some 15,000 employees engaged in the manufacture of textiles and footwear made of both fabric and rubber. In order to use the Reclaimator process, Alpargatas will construct a new plant in the Argentine, scheduled to begin operations in January, 1956, with a capacity of 7,000 pounds per day initially and with a potential capacity of 25,000 pounds per day with the installation of additional Reclaimators. Machinery and processing equipment for the new plant will be purchased in the United States and assembled in the Argentine with technical and engineering data furnished by U. S. Rubber Reclaiming. The new plant will be a smaller version of the plant U. S. Rubber Reclaiming operates in Cheektowaga, N. Y., which has a capacity of 120,000 pounds of reclaim per day. The licensing agreement provides for a royalty payment on each pound of the material Alpargatas produces under the Reclaimator patent, with a minimum yearly charge. U. S. Rubber Reclaiming officials said the Buffalo company is discussing licensing arrangements of its Reclaimator proces with companies in other countries in South America, the United States, Europe and the Far East.

Non-Directional Tractor Tire

A new non-directional tractor tire, available in six sizes, has been announced by the B. F. Goodrich Co. Tire & Equipment Division, Akron, Ohio. The tire is said to be ideal for various operating conditions such as are found in loose or sandy soils where good traction and high flotation are needed. It may also be operated on the highway, in yards and driveways, both inside and outside of industrial plants, on golf courses, in cemeteries, and on other jobs with relatively hard surfaces. The tire is now available in the following sizes: 11-28, 9-16, and 12-26, all 4-ply; 13-26, 14-26, and 15-26, all 6-ply.

New Surface-Treated Kaolin

Minerals and Chemicals Corp. of America, Metuchen, N. J., has announced a new surface-treated kaolin having hydrophobic characteristics. Untreated kaolins, as a class, are considered hydrophilic. This ability to change the surface characteristics of ASP products opens up important new applications in organic systems, the company states. Some of the properties of "ASP 1300" are low absorption, ease of dispersions in organic systems and resistance to water. It should be evaluated in rubbers, paints, inks, reinforced plastics and other organic systems. It is not recommended for aqueous systems, the firm declares. "ASP 100" and "ASP 1300" have the same particle size distribution. ASP 1300 differs from ASP 100 only with respect to the surface treatment. This product has been developed and tested in the Minerals & Chemical laboratory and pilot plant operations and is available for commercial sales. Stocks are available for sampling and warehouse requirements.

Cabot Reprints Available

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has announced the availability of two reprints. The first of these, "Influence of Surface Roughness and Porosity on the Performance of Carbon Blacks," first appeared in *Industrial and Engineering Chemistry;* the other, "Determination of Relative Road Wear Ratings of Tire Tread Stocks," originally appeared in *Rubber World.* Both reprints are available from the company.

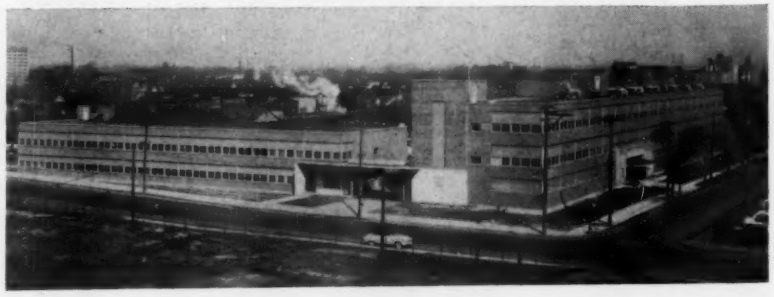
Establish Safety Records

Six plants of the B. F. Goodrich Chemical Co. established new safety records in 1954 to keep pace with the over-all record of the chemical industry, it has been announced by the Manufacturing Chemists' Association. Industry lost-time accidents amounted to 3.27 per million man-hours worked, the lowest figure in the history of the industry and an 11% improvement over 1953. The industry's accident severity rate also declined 40% over 1953. Goodrich Chemical plants, in recording their safest year of operation, actually marked up less than two disabling injuries per million man-hours worked, considerably less than the industry average. John R. Hoover, president of Goodrich Chemical, reports that certificates of safety achievement for 1954 were presented to each plant which completed the calendar year without a lost-time accident. These included plants at Louisville and Calvert City, Ky., Port Neches, Texas, Institute, W. Va., the Avon Lake, Ohio, general chemicals plant and the Avon Lake Experimental Station.

Surface Treated ZnO Pellets

St. Joseph Lead Co., New York, N. Y., reports the installation of new and enlarged equipment for the manufacture of surface-treated zinc oxide pellets. The company is now in a position to ship carload or less than carload quantities. Now available are "Black Label No. 20-21" (fine particle size) and "Green Label No. 42-21" (medium particle size) zinc oxides in pellet form.

NATIONAL ANILINE OPENS NEW RESEARCH CENTER AT BUFFALO PLANT



Open house ceremonies from May 19 to 21 marked the formal opening of the new Research and Engineering Center constructed by the National Aniline Division of the Allied Chemical & Dye Corp., at its Buffalo, N. Y., plant. The Research and Engineering Center is a connected two-building facility, combining National Aniline's research and engineering departments. As seen in the photograph above, the Engineering Building is to the left, and the Research Building is to the right. The Research Building is a three-story structure 337 feet long by 58 feet wide with a floor area of 36,500 square feet devoted to laboratories and 20,000 square feet for offices, library and service facilities. A one-story wing 111 feet long is assigned to dye application research exclusively. Totally, the Research Building contains 63,000 square feet and provides for initial occupancy of approximately 165 persons.

The Engineering Building, two stories in height, corresponds architecturally to the Research Building. It is 206 feet long and 58 feet wide, with a total floor area of 23,000 square feet. The new Research Center will provide chemical research and development and engineering service to all National Aniline plants and facilities located throughout the United States. At present, the Division operates a dyestuffs and organic chemicals manufacturing plant at Buffalo, an aniline and maleic anhydride manufacturing plant at Moundsville, West Va., where facilities for the manufacture of diisocyanates are now in the course of construction, and a caprolactam monomer and spinning plant for producing Allied Chemical's "Deep-Dye" nylon at Hopewell, Va.

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MURPHY DELIVERS LECTURE ON DEVELOPMENT OF FOAM RUBBER

E. A. Murphy, manager of the Development Division at the Dunlop Research Center, Fort Dunlop, Birmingham, England, delivered the Tenth Annual Foundation Lecture of the Institution of the Rubber Industry on May 20 at Birmingham University. Mr. Murphy, one of the original inventors of latex foam rubber, spoke on the "Development of Latex Foam Rubber."

The speaker reviewed the early uses of latex and described the earliest experiments in making sponge rubber from latex. Latex foam made under Dunlop patents was first introduced into the United States in 1932 and by 1935 all major U. S. rubber manufacturers were producing latex foam rubber under license from Dunlop. The speaker noted that with the coming of World War II, natural rubber latex supplies were cut off, and so, production ceased.

Up to this time, Mr. Murphy stated, numerous proposals for manufacturing latex foam by alternative processes had appeared, The speaker described some of these processes.

With the ending of the war, several advances in the manufacture of latex foam rubber were announced. The first significant development described was the continuous foaming process, originally disclosed in a Dunlop patent of 1936. Recent developments in this direction, he said, have come from the Oakes process in the U. S. which, like the original Dunlop foaming process, uses a principle belonging to the food industry.

Acceptance of Latex Foam

Mr. Murphy observed that the universal acceptance of latex foam as a cushioning material demands a survey of its physical characteristics. They can be divided into its physical properties as such, together with its attraction to seating manufacturers as a pre-fabricated cushioning unit.

The most important physical properties of latex foam rubber are its greater strength per unit of weight than ordinary sponge rubber, and its high resilience and complete recovery when it is deformed. The latter factor is particularly important, the speaker said. Mr. Murphy also discussed other significant properties of foam rubber, together with their application to different products.

Mr. Murphy declared that the cutting off of natural latex supplies during the war led to attempts in the U. S. to use synthetic latex for foam rubber production. This was initially held up, he said, due to the question of odor. Although this has largely been overcome, the general purpose type of synthetic latex still gives certain production difficulties for foam rubber, so that it is at present only used when blended with the natural product, the average proportion used being about 35%, the speaker declared.

Mr. Murphy then discussed the development of synthetic materials for foam rubber production, particularly the polyurethanes and foamed polyvinyl chloride. He compared the physical properties of natural latex foam rubber, polyurethane rubber and foamed PVC. Mr. Murphy stated that there is still much to learn about both polyurethane and foamed PVC. Their availability, however, will tend to promote the further development of natural latex foam.

Mr. Murphy accompanied his lecture with graphs showing the increase in consumption of latex for foam production in the United States and the United Kingdom.

BEACH AND KOVAC RECEIVE FIRST RUBBER AGE AWARD AT AKRON UNIVERSITY

As reported in our June, 1955, issue, an annual prize in the amount of $100 for the student who prepares the best term paper or the best thesis for his degree in rubber chemistry has been established by RUBBER AGE at the University of Akron, Akron, Ohio. The first award was shared by Kermit C. Beach and Fred J. Kovac for their joint thesis on "A Compounding Study of Butyl Rubber". The photograph above shows (left to right) Peter P. Pinto, general manager of RUBBER AGE, presenting the award to Messrs. Beach and Kovac during special ceremonies conducted at the University of Akron on Thursday, May 19.

Morflex P-50 Vinyl Stabilizer

Morton-Withers Chemical Co., Greensboro, N. C., has announced the development and introduction to the market of a new high molecular weight polymeric plasticizer for vinyl resins, designated as "Morflex P-50." This product is a water-white liquid, combining ease of handling, ready compatability with vinyls, easy milling, excellent color and aging, extreme low extraction characteristics in water, soapy water, oil and air; extreme efficiency permitting lower percentages to obtain desired physical characteristics than have been heretofore possible, and unusually high electrical qualities. It is claimed by Morton-Withers that P-50 gives the maximum combination of efficiency, permanency, high electricals, light color and ease of handling now available in polymeric products.

Any changes in the information submitted for the 1955-56 RUBBER RED BOOK? Notify us today!

Chlorowax LV Plasticizer

Development of a low-viscosity secondary plasticizer for compounding polyvinyl chloride resin has been announced by the Chlorinated Products Division of the Diamond Alkali Co., Cleveland, Ohio. Known as "Chlorowax LV", the new material is a modified liquid chlorinated hydrocarbon providing substantially lower viscosity than normal 40% chlorinated paraffins. Approaching that of primary plasticizers in present general usage, the viscosity of Chlorowax LV falls in the five poise range at 25°C., facilitating easier plant handling, the company states. Other important advantages, the manufacturer states, are improved fluidity, tending to give flexible plastics better physical characteristics at low temperatures, and greater stability, an important aid in processing that contributes to products having better aging characteristics. This chlorinated product is odorless, non-toxic and nonflammable.

Enjay Butyl Manual

Enjay Co., Inc., 15 West 51st Street, New York 19, N. Y., has published a new manual containing pertinent information on Butyl rubber. Made available in a handsome loose-leaf binder, the manual contains initial data on Butyl. As additional sections are published they can be added to the binder. Copies of the manual may be had on request to the company.

RUBBER-STICHTING HOLDS INTERNATIONAL SYMPOSIUM ON TIRES IN DELFT

A total of 166 delegates representing fifteen countries attended a symposium on tires held on May 12 and 13 at the headquarters of Rubber-Stichting in Delft, Holland. The general purpose of the meeting was to discuss tire behavior on the road. Special attention was also given to the correlation between laboratory and road tests. The symposium was held under the joint direction of Dr. Ir R. Houwink, director general of Rubber-Stichting, and Dr. H. C. J. de Decker, director of research for the organization.

After an opening address by Dr. Houwink, W. Hofferberth of Deutsche Dunlop Gummi-Compagnie A. G., delivered a paper on "The Loading of a Pneumatic Tire and its Deformations". The speaker stated that knowledge of the loading to which a tire is subjected and of the resulting distortion, is of paramount importance to the tire manufacturer.

The influence of air pressure, dimensions, and loading on statical resilience can be demonstrated by measurements, the speaker stated. These calculations are difficult, however, owing to the heterogeneous and anisotropic nature of the tire. The magnitude of the angle between the cords is, among other factors, very important to the distribution of tension in the tire, the speaker declared.

The next speaker was Dr. K. Knauerhase of Phoenix Gummiwerke A. G., who presented a paper on "Physical Considerations on Side-Slipping on Dry or Wet Roads". Dr. Knauerhase stated that in the fight against skidding, the adhesion of the tread to the road surface has up to now been neglected.

From the laws of adhesion of interfacial layers, with liquid as an intermediate layer, it appears that the high surface tension of water is very favorable. The wetting power of the water contacting the two surfaces should be high, he said. Laboratory tests show that for reducing skidding, both hydrophilic rubber compounds and hydrophilic road surfaces should be the goal. A hydrophilic tread grips a hydrophilic road surface very well, but skids on hydrophobic roads, a hydrophobic tire, on the other hand, skids on any wet road surface, the speaker declared.

Paper on Electrical Charging

Dr. F. Hommell of Deutsche Dunlop was the next speaker, presenting a paper on "Electrical Charging of Tire and Vehicle." Dr. Hommel observed that friction with the road surface causes a tire to be electrically charged. This may lead to electric shocks on touching the vehicle, disturbances in radio reception and leaky inner tubes. In discussing this problem, Dr. Hommel made the following points:

(1) The charge picked up by the vehicle is directly in proportion to the electrical resistance of the tire; (2) The voltage depends on the speed of the car and increases according to a curve concave toward the horizontal axis; (3) Both the tire and the vehicle are generally negatively charged. There are, however, some occasions where the opposite occurs; (4) It is not only by a modification of the electrical resistance of the tire that changes in the charge may occur. A conductive layer incorporated between the tube and tire, for example, will reduce the charge of the vehicle by approximately 25%.

The charged tire gradually yields its electricity which flows to spots of lower potential. These spots are, as far as the vehicle is concerned, the inner spaces of the fenders which thus act as Faraday cages. It is from this point that the surface of the chassis is charged.

If the turning wheel is subjected to considerable changes in its resistance, impulsive phenomena may arise which disturb the reception of the car's radio. The frequency of these disturbances is in keeping with the number of revolutions of the wheels.

Owing to electrical induction, the charge of the tread will induce potential differences between tube and tire. This will lead to ionization of the air between cover and tube, thereby creating conditions for the formation of ozone. Tubes attacked by ozone will show cracks and will, as a result, become leaky.

Tire Wear and Fuel Consumption

Dr. de Decker was the next speaker and directed his remarks to the relationship between tire wear and fuel consumption. Dr. de Decker stated that when natural rubber tires are compared with synthetic rubber tires at a temperature of approximately 60°F., they wear equally well. At lower temperatures, however, the synthetic rubber tire wears more, while the natural rubber tire wears less. At higher temperatures the opposite occurs.

Dr. de Decker stated that it must be pointed out that synthetic tires always involve a 3½% higher fuel consumption. From these two observations it may be concluded, he said, that in temperate zones the use of natural rubber has an advantage over synthetic. Calculations for the whole world show that most cars ride more economically on natural rubber tires, he declared.

Dr. A. Schallamach, for his part in the symposium, presented a paper on "Fundamental Considerations on Wear and Tear of Rubber." He stated that previous work on the effect of local tension concentrations of rubber surfaces has shown that intrinsic abrasion resistance, in a restricted sense, depends on the tear resistance of the tread compound. The intrinsic abrasion resistance is determined under conditions without the occurance of an abrasion pattern and under constant deformation of the test piece, he stated.

The wear of a tire depends, under certain test conditions, on such things as the rigidity of the tire, the intrinsic abrasion resistance, and the tendency to form an abrasion pattern. The skid depends on the rigidity of the tire which, in turn, is connected with the rigidity of the tread. Increased rigidity entails decreasing skid and wear. More fundamental is the effect of rigidity on the occurance of an abrasion pattern. In general, abrasion is promoted by an abrasive pattern. There is a more pronounced abrasion pattern at low moduli.

"Conclusions on the Service -Life of Treads Based on Laboratory Tests" was the title of the paper presented at the symposium by W. Kern of Metzeler Gummiwerke A. G. Mr. Kern said that before subjecting a tread to road tests, it is usual to carry out a rough sorting on laboratory test apparatus. It is only possible to obtain a correlation between laboratory and road tests if a great many conditions are met. Not only the manner of testing but the intensity of the test should conform to service conditions.

Next, Dr. K. Voelz of Continental Gummiwerke A. G. spoke on "The Use of Statistics in Tire Testing." He stated that as a measure of the quality of a tire, the number of complaints may, for want of something better, be taken. The law by which these complaints reach the manufacturer may then be framed by means of the statistics of claims in former periods of manufacture.

If this law is operative, it will be possible to estimate at the very beginning, when the first claims are coming in, the total volume of the claims to be expected.

Dr. B. B. S. T. Boonstra of Godfrey L Cabot, Inc., was the next speaker at the symposium. Dr. Boonstra delivered a paper on "The Correlation Between Wear and Friction of Rubber Materials." After a theoretical introduction to the wear of rubber and a description of the Cabot-Lambourne abrasion apparatus, the results of some tentative abrasion resistance measurements on Vulcollan were discussed. It was stated that the very good abrasion resistance found in testing Vucollan may be due to a great amount of skid.

New Types of Tire Rubbers

Dr. C. Pinazzi of the Institut Francais du Caoutchouc expressed his views on the tire of the future by a consideration of "New Types of Rubber for Tires." While the manufacturers of synthetics are proceeding with the development of rubberlike materials, the natural rubber producers have not been idle, the speaker said. The new natural rubber types such as the graft polymers offer a series of new rubber derivatives which have a certain degree of internal reinforcement.

High modulus rubbers are natural rubbers whose vulcanization has been activated by special treatment on the estate. The work being carried out by the Institut Francais du Caoutchouc and Rubber-Stichting has led to promising developments, such as the reinforcement of both natural latex and dry rubbers with resin. Light-colored casings, and not only white sidewalls, have thus become a technical possibility.

Dr. E. Pieper of Vereinigte Glanzstoff-Fabriken A. G. in his paper on "The Present Level of Quality of Modern Textiles for Tires" stated the increasing replacement of cotton by rayon in tire carcasses is causing the tire industry to become one of the most important outlets for the rayon industry. The hope was expressed that in close cooperation between the tire and textile industries, mutually recognized test methods for cords would be developed.

Dr. R. Hublin of the Institut Francais du Caoutchouc also spoke at the symposium, presenting a paper on "New Types of Tires." Dr. Hublin said that the duties a

passenger car tire is called upon to perform include traction, adhesion to the road, the absorption of shock and, particularly, the absorption of small irregularities in the road surface. The first three functions could easily be taken over by mechanical devices, he stated, but this is not so as far as the absorption of road irregularities is concerned. Only rubber can be used economically for this purpose.

Dr. Hublin observed that it would be possible to predict the form of the tire meeting this requirement now—if the knowledge of the mathematics of the physical phenomena in a running tire was at a more advanced stage.

The last speaker of the symposium was Dr. J. C. Gerritsen, who dealt with the "Economic Function of the Tire in World Traffic." The speaker stated that the average life of a pneumatic tire has, as a result of technical improvements, increased by 100% since 1920. Due to the favorable developments in retreading, the life of the carcass has been extended by 150%.

In contrast to the ever-increasing performance of the pneumatic tire are the falling costs of construction and the selling price. Calculations show, he said, that the tire manufacturer has made, over a range of years, an additional profit of only 2% per year, whereas approximately ten times this amount has been ceded to the customer.

Marbon Introduces Ty-Ply BC

Marbon Chemical, Division of Borg-Warner Corp. at Gary, Ind., has introduced "Ty-Ply BC", a cover cement designed for the vulcanized bonding of Butyl compounds to metals. The new product is said to be an efficient one-coat adhesive for the vulcanized bonding of Butyl rubbers to each other and to other types of rubbers. TY-Ply BC is a black liquid containing dispersed solids; is supplied at brushing viscosity; is 17% solids; has a dry time of 30 minutes (at room temperature); has 6.68 pounds per gallon, and covers 600 square feet per gallon. Marbon Chemical states that the storage stability of Ty-Ply BC can be considered excellent. Storage of the adhesive for one month at temperature extremes of —50 to +50°C, showed no adverse effects on the cement, application properties, or adhesion obtained. This good stability to heat also indicates the feasibility of hot application of Ty-Ply BC for rapid dry.

Miller Has Book of Poems

Every once in a while we come across some hidden talent among the rubber fraternity. The latest information concerning such talent concerns Samuel J. Miller, chemical director of the DuBois Co., Inc., of Cincinnati, Ohio. Mr. Miller has just had a book of poems published under the name of "Chaff and a Little Grain." While we do not consider ourselves experts in the field of poetry, we did enjoy reading Mr. Miller's poems, many of which are tongue-in-cheek observations of people and their foibles. The book is published by Exposition Press, Inc., 386 Fourth Ave., New York 16, N. Y., and sells at $2.50 per copy.

ACUSHNET PROCESS CO. ADVANCES THREE TO NEW EXECUTIVE POSITIONS

T. C. Weaver

W. Bommer

A. Hawes

Acushnet Process Co., New Bedford, Mass., has announced the promotion of Thomas C. Weaver, formerly factory manager of the Rubber Division, to vice-president. Mr. Weaver also heads the planning group responsible for the modern plant addition recently opened by the company. Also announced was the promotion of William Bommer, of the Golf Ball Division, to vice-president of the Acushnet Process Sales Co. Since 1949, Mr. Bommer has played a very active part in the growth of the Golf Ball Division, serving in the capacity of assistant factory manager, chief engineer, and most recently, as assistant manager. In another appointment, Adelbert Hawes was advanced to the position of assistant treasurer of the Acushnet Process Co. and the Acushnet Process Sales Co. Mr. Hawes has been associated with the Credit Department of both divisions since 1941.

Introduces Cabflex TCP

The Plastics Chemicals Division of Godfrey L. Cabot, Inc., Boston, Mass., has announced the commercial availability of "Cabflex TCP," tricresyl phosphate, made from petroleum cresylic acid. Twelfth in the Cabot line of plasticizers, Cabflex TCP has been specifically developed for the manufacture of wire vinyl insulation. Especially significant in the production of this newest Cabot plasticizer is the fact that a compound made with both new Cabflex TCP, tricresyl phosphate, and Cabflex DDP, di-decyl phthalate, has already been approved by Underwriters' Laboratories, Inc., for use in both 80°C. and 90°C. wire vinyl insulation. The approved compound containing both Cabot plasticizers is now being manufactured by at least one company in commercial quantities for use in the specified types of vinyl insulation. Mixed tank truck and tank car quantities of Cabflex TCP and Cabflex DDP are ready for immediate shipment from Cabot for use in the manufacture of all types of high temperature wire vinyl insulation compounds.

Technical Report Available

Golden Bear Oil Co., 325 West Eighth St., Los Angeles 14, Calif., has announced the availability of G. B. Report No. 8, "Chemical Nature of Oil Extenders for Synthetic Rubbers," by F. S. Rostler and R. M. White. As with previous company reports, the purpose of presenting this report is to make available as ready reference information on petroleum products which are of interest to rubber compounders. Printed in handy booklet form, the report first appeared in *Industrial and Engineering Chemistry*.

Need a personal copy of RUBBER AGE? Use the coupon on page 631.

Silicone Rubber Packaging

At the recent Fibre Box Exhibit in Chicago, Ill., a new container which was especially developed for the Silicone Products Department of the General Electric Co., Waterford, N. Y., was shown. Though the new container holds 50 pounds of rubber, it is lighter and more easily handled than the conventional 40-pound capacity pails and cartons formerly used. In addition, it requires no stapling by the user, thus eliminating another time-consuming operation. A polyethylene film liner in the fibre container seals out moisture, while dirt and other foreign substances are excluded by the package itself. The new fiberboard package can be quickly opened at the use-point by slitting two tapes. If only a portion of the silicone rubber is used, the container may be resealed by refolding the polyethylene inner wrap. The container is a two-piece, die-cut, self-locking telescope package constructed from single-wall corrugated fiberboard with a burst-strength of 275 pounds. When the top and bottom are assembled, it is so constructed that all sides have five thicknesses of corrugated fiberboard to provide maximum stacking strength and to minimize the possibility of collapse. Packing, storage and freight costs are said to be materially reduced through the use of the new container.

Hycar Technical Newsletter

B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced the publication of Volume 3 of the "Hycar Technical Newsletter". The information contained in this annual edition is a compilation of the salient features presented in the Newsletters that were published during 1954. Previously unpublished material will also be found in this edition. Copies are available from the company.

RUBBER GROUPS ABOUT THE COUNTRY HOLD ANNUAL SUMMER OUTINGS

With the coming of the summer months, many of the rubber groups about the country forego their usual technical meetings to hold picnics, golf tournaments and outings. These affairs normally feature different athletic contests, while those less athletically inclined play cards, nap under a shady tree, or just sit and talk with the boys. Reports on the activities of some of these groups at their annual outings follow:

BUFFALO RUBBER GROUP

Approximately 90 members and guests attended the Annual Summer Outing held by the Buffalo Rubber Group on June 21 at the Lancaster Country Club, Lancaster, N. Y. The day's activities included a golf tournament and other sporting events and games. A special steak dinner was served. C. E. Johnson (Hewitt-Robins), chairman of the Buffalo Group, presided over the festivities. The following were awarded golf prizes: Bob Sucher (Witco Chemical), Bob Rowe (Sharples Chemicals), C. Shintius, Henry Lewanski and J. Timpson (Hewitt-Robins), Glenn Meyer (Glenn Meyer Co.), Paul Koons (Goodyear Chemical), and Nick Johnson (Socony-Vacuum). In other activities, Paul Sick (Hewitt-Robins) won the baseball throw, while Glenn Meyer won the balloon throw. In the softball game, the "Out-of-Towners" won handily from the "In-Towners."

FORT WAYNE GROUP

The Fort Wayne Rubber and Plastics Group held its fourth annual golf outing at the Tippecanoe Lake Country Club, Leesburg, Ind., on June 10. About 210 members and guests attended, many competing in the golf tournament, while others played baseball, horseshoes and cards. A lobster and roast beef dinner was served.

The golf prize was awarded to Francis Frost (Frost Rubber) for first low gross. Mr. Frost won the golf trophy presented by Goshen Rubber and another presented by Jasper Rubber. Ed Hession (Mogul Rubber) received the golf trophy presented by Jasper Rubber for low net. Other golf prizes were awarded to the following in the events noted:

Longest Drive—C. White (Toolcraft Industries) and Al Robinson (Harwick-Standard); *Closest-to-the-Pin*—Roy Marston (Binney & Smith); *High Gross*—F. Millard (Goodyear Chemical). Other golf prizes were awarded to Cal Yoran (Brown Rubber), James McCurdy (DuPont), Ferd Nanherney (Godfrey L. Cabot), Gerald Gonyer (Farrel-Birmingham), Ed Bosworth (Binney & Smith), John Lawless (DuPont), Francis Frost (Frost Rubber), Carl Ihrke (U. S. Rubber), R. Tobin (U. S. Rubber), James Holmes (Schenectady Varnish), Maury Jones (Marbon Chemical), Dick Loges (Binney & Smith), Les Kurtz (DuPont), R. Blair (Mogul Rubber), Dave Sherman (U. S. Rubber), H. Cantwell (U. S. Rubber), and F. Molen (Naugatuck Chemical).

The Outing Committee consisted of: Walt Wilson (R. T. Vanderbilt), chairman; Charles Dietrick (Syracuse Rubber Products), vice-chairman; John Lawless (DuPont); Bill Erwin (U. S. Rubber); Paul Lantz (Syracuse Rubber Products); Wayne Place (Jasper Rubber Products); Ed Wray (Belden Mfg.); Tom Pollard (Monsanto Chemical); Al Laurence (Phillips Chemical); Jack Stiff (Binney & Smith), and Dick Flack (General Tire).

LOS ANGELES GROUP

The Los Angeles Rubber Group held its 1955 outing on June 4 and 5 at the Hotel del Coronado, Coronado, Calif. Approximately 285 members and guests attended the outing, setting a new record for the group. The majority participated in two or more athletic events which were in progress for two days. The finalists were awarded prizes in the different events noted:

Ping Pong—John Arensmeyer, Bernie Hadowski, Charles Evans and Chet Froude; *Golf Putting*—Thomas Corcoran, Arch Mease, Jack Buehler and Al Marone; *Football Punt*—Paul Samsell and Dick Wells; *Darts*—Ship McMahon and Don O'Connell; *Baseball Throw*—Bob Mikuto and Bob Witmond; *Shuffle Board*—L. E. Budnick, Dan Budnick, Fred Woerner and Glen Goes.

Tennis—Jesse Stelle, Barry Everatt, Wendell Higbee and Al Federico; *Swimming Relay Race*—Charles Kuhn, Larry Snow, Bob Kavish and John Dirkin; *Fishing Event*—Ray Stair and Charles Kuhn; *Tug-of-War*—Messrs. Poole, Palumbo, White, Steele, Kotish, Snow, Carver, Durkin and Uber.

A special three-day golf tournament, a feature of the annual outing, played at Caliente, Mexico, resulted in the following winners:

Longest Drive—A. P. Steller; *Low Gross*—Don Montgomery and Fred Bove; *Low Net*—M. T. Giannota, Marvin Moon and Roy Phelan; *Blind Bogey*—Al Pickard, Robert Bowen and Jake Ritchie; *Longest Putt*—Don Nyman; *High Gross*—William Irland; *Closest-to-the-Pin*—F. C. Johnston; *Guessing Contest*—Al Subrin and Robert Dougherty.

NEW YORK RUBBER GROUP

Approximately 200 members and guests of the New York Rubber Group attended the Annual Outing held on June 9 at Doerr's Grove, Millburn, N. J. Activities of the day included a full schedule of games and sporting events. Food and beverages were served all afternoon and the festivities were concluded with a roast chicken dinner. M. R. Buffington (Lea Fabrics) served as chairman of the Outing Committee. The volley ball game was won by the team captained by M. F. Malkiewicz (Manhattan Rubber), and the softball game by the team headed by A. M. Gessler (Standard Oil Development). Other events were won by the following: *Horseshoes*—Bill Lamela and Mr. Buffington; *Boccie*—Cal Fuller (Raybestos-Manhattan) and Bill Meeker (Pequanoc Rubber); *Golf Drive*—Mr. Buffington; *Baseball Throw*—R. Ebersbach (American Hard Rubber); *Basketball Throw*—B. D. Allen (Stauffer Chemical).

RHODE ISLAND RUBBER CLUB

Gray skies and occasional showers did not curb attendance at the Annual Outing held by the Rhode Island Rubber Club on June 2 at the Pawtucket Country Club, Pawtucket, R. I. About 270 members and guests, a new record, turned out for the outing and participated in a full schedule of games and sporting events. The day's activities concluded with a roast beef dinner and the distribution of awards and door prizes.

W. Blecharcyzk (Davol Rubber) served as chairman of the Golf Tournament Committee, assisted by E. C. Uhlig (U. S. Rubber). W. K. Priestley (U. S. Rubber) served as chairman of the Door Prize Committee, and he was assisted by R. W. Szulik (Acushnet Process), H. W. Day (DuPont), and H. Ebert (Firestone). G. E. Enser (Collyer Insulated Wire), secretary-treasurer of the group, handled the putting contest, prize tickets and dinner reservations. In the golf tournament, the following events were won by the persons noted:

Low Gross—F. Newman (Respro) and J. Christopher; *Low Net*—E. Parent (Bestread Products), L. V. Sarni (Griswold Rubber), and H. William Cook (Goodrich Chemical); *Blind Bogey*—G. Ritchie (U. S. Rubber), L. Rossiter (Nopco Chemical), and R. Szulik (Acushnet Process); *Closest-to-Pin on 7th Hole*—L. Yates (Atlantic Paper and Twine); *Closest-to-Pin on 13th Hole*—B. Mulligan (J. U. Starkweather); *Closest-to-Pin on 15th Hole*—Tom Joy (Gulf Oil).

Most 6's—Gordon White (Davol Rubber); *Most 7's*—J. Mazza (U. S. Rubber); *Most 8's*—R. Rowe (Sharples Chemical); *High Gross*—J. Martin (Goodrich Chemical); *High Net*—R. Rowe; *Longest Drive*—F. Newman (Respro); *Putting Contest*—S. H. Tinsley (R. T. Vanderbilt) and F. Langhorst (Stanley Chemical).

Appointed to New Post

The Rubber Heel and Sole Institute of New York, N. Y., has announced that its executive director, Robert A. Winters, has been appointed to the position of business manager of the Department of Physics at Princeton University. Mr. Winters is also general manager of the Elastic Colloid Research Corp., the research agency of the Rubber Heel and Sole Institute. He is a graduate of Princeton University and holds a Ph.D. in economics from Harvard University. Mr. Winters is a trustee of the Presbyterian Homes for the Aged of the State of New Jersey. He is a member of the Forecasters Club of New York City, the American Economic Association and the Industrial Relations Research Association.

Any changes in the information submitted for the 1955-56 RUBBER RED BOOK? Notify us today!

Lovell Elected Vice-President

G. Allen Lovell

G. Allen Lovell has been elected a vice-president of the U. S. Rubber Co., New York, N. Y., and appointed general manager of its Mechanical Goods Division, effective July 1. He was formerly assistant general manager of the division, a post to which he was appointed in November, 1954. Mr. Lovell joined U. S. Rubber in 1918 as an apprentice in the Williamsport, Penna., plant. He rose steadily, becoming manager of production control in 1932. Later that same year he transferred to the company's plant in Mishawaka, Ind., and in 1936 he joined the sales department of the Footwear and General Products Division. Mr. Lovell became manager of coated fabrics sales in 1938, sales manager of foam rubber in 1944 and sales manager of all manufacturers' products in 1949. He is a native of Williamsport and was educated there.

Sounding Balloon Evaluation

A laboratory method for predicting the flight performance of aerological sounding balloons has been developed by G. M. Martin, John Mandel, and R. D. Stiehler of the National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C. The method effectively simulates actual flight conditions by giving a small sample of the balloon material a two-dimensional stretch at temperatures approximating those encountered at high altitudes. From measurements made on the stretched material, the maximum altitude to be expected in flight can be computed. In this country, sounding balloons are usually made of neoprene film with an unstretched thickness of about 0.003 inches and a weight of 500 to 600 g.

Doubles Milling Capacity

Berea Rubber Co., Berea, Ky., has doubled its milling capacity with the installation of a new 60-inch heavy-duty rubber mill. Other additions at the plant include new machinery for materials handling. Berea Rubber recently constructed a 2,200 square foot addition to the plant area to provide more space for compounding and mold repair facilities. The new addition also supplies needed warehousing space.

LABOR NOTES

B. F. Goodrich Co. and the URW signed a new five-year agreement covering pensions, insurance and severance pay on June 19, thus averting a strike set for midnight of the same day. In the new pact, a company-paid pension plan replaces a 21-year-old program under which both company and employees had contributed. Employees will have the option of getting back the money they have paid in or leaving it in to build up their pensions.

Minimum pensions will be computed on the basis of $1.80 a month for each year of service up to 30 years. Those who reach 65 with less than 15 years service, but with more than 10, will receive the minimum pension of $27 a month, just as though they had 15 years' service. The $27 is exclusive of Social Security benefits.

Above the minimum pensions will be computed on a formula based on earnings, with the base earnings period being that between January 7, 1945, through December 31, 1954. This means that the average earnings of that period will be used for all years prior to 1955. The formula, calling for one-twelfth of 1% of accumulated earnings, minus one-half of Social Security, is tied in with length of service.

The program is set up on the basis of compulsory retirement at 65. Early retirement is provided for after 55 for an employee with 20 years' service. The normal pension will be reduced by four-tenths of 1% for each calendar month when retiring employees are under 65.

The International Policy Committee of the United Rubber Workers, CIO, has adopted a program for 1955 calling for a "substantial" general wage increase, a guaranteed annual wage program and other benefits. The nine-point policy resolution included a platform calling for "reduction in hours without loss of pay where necessary to protect employees who may be displaced by the increasing development in technological advances in the rubber and allied industries."

The resolution said "continued improvement in the economy and even higher profits" in the industry "justify the improvement of contract clauses concerning conditions of employment. Technological advances promise a higher standard of living and an abundance of consumer goods, but can result in the displacement of some employees and reduction in the take-home pay of others."

Other points of the bargaining program outlined include extension of welfare benefits, elimination of "existing inequalities" in job scales, elimination of intra-plant and area wage differentials, liberalization of fringe benefits such as vacations and premium pay, strengthening of seniority rights, extension of the union shop, and a special session of the Canadian Section of the Policy Committee to promote, as far as possible, standards adopted for U. S. workers.

Flightex Fabrics Inc., 93 Worth St., New York 13, N. Y., has published a new swatch folder showing samples of industrial fabrics and tapes in cotton, glass, vinyon, dynel and orlon.

Named Factory Superintendent

Loren J. Sewall

Loren J. Sewall, formerly chief estimator for the Minnesota Rubber and Gasket Co., Minneapolis, Minn., has been promoted to factory superintendent of the firm. As of May 15, Mr. Sewall has been in charge of all manufacturing operations for the company. He has been associated with Minnesota Rubber since 1941, in positions in the molding and engineering departments.

Carwin Reduces TODI Price

Carwin Co., North Haven, Conn., has announced a substantial reduction in the price of "TODI" bitolylene diisocyanate in recognition of the widespread attention it has attracted in the development of the new polyurethane synthetics. This price reduction will be of material assistance in the development of its economical use for the manufacture of solid elastomers, rigid and flexible foams, adhesives, synthetic fibers, and resins for coating and molding applications. TODI has been found to impart excellent toughness and abrasion resistance to many polyurethane systems made from it, the company states. In addition, the relatively high melting point of TODI is associated with a low order of volatility which minimizes hazards from vapor exposure in its use for the fabrication of such systems. TODI is now being offered at $1.50 per pound in ton lots, $2.00 per pound in standard drums, and $2.50 per pound in less than standard drums. Truckload quantities will be supplied upon reasonable notice at $1.30 per pound. A revised technical data sheet has also been issued to assist users in their application research. Copies are available from the company.

Introduces New Plasticizer

Rubber Corp. of America, Brooklyn, N. Y., has announced a new plasticizer, "BD-8" (butanediol dicaprylate). This plasticizer is a glycol ester with superior low temperature behavior and improved resistance to extraction, the company states. The compatibility of BD-8 with many synthetic rubbers is excellent. Full technical information on this plasticizer is available from the company on request. It is available in commercial quantities.

Names in the News

RAYMOND W. BALINT has joined the Cords and Fabrics Research Section of the Goodyear Tire & Rubber Co., Akron, Ohio.

DR. NORMAN A. SKOW, director of research for the Synthane Corp., was to have represented the United States at an international meeting on standards held in Paris, July 8-13. He was to have served as secretary to the meeting on plastics of the ISO.

HOWARD HAWKES, vice-president of the U. S. Rubber Co., has been named chairman of the Rubber Division for the 1955 Greater New York Fund Campaign.

ALLEN LEROY EMPTAGE has been appointed head of the Central Engineering Department of the Interchemical Corp. He succeeds Richard G. Knowland, who established the department in 1948 and who will continue with it on a part-time consulting basis.

JOHN F. WHITCOMB, associated with the Minnesota Mining and Manufacturing Co. since 1935, has been named general sales manager of the coated abrasives and related products division, and RICHARD L. SHEPPARD has been named general sales manager of the cellophane tape division.

JACK W. REMBE has been elected vice-president of the Rodney Hunt Machine Co., while W. HARRY WALLACE has been appointed plant manager of the company.

JOSEPH F. RIVES, formerly packaging engineer for the J. M. Huber Corp., has been promoted to assistant to A. Z. HAHN, vice-president of the Carbon Black Division.

PHILIP MCLAUGHLIN has been named assistant manager, sales development, for the Stauffer Chemical Co., New York, N. Y.

ARTHUR B. WARNER, formerly factory superintendent of the Minnesota Rubber and Gasket Co., has been promoted to chief engineer.

DR. KARL T. ZILCH has joined the research staff of Emery Industries, Inc., where he will be directly connected with the fatty acids and esters laboratory.

E. RALPH ROWZEE, vice-president and manager of the Polymer Corp., Ltd., was awarded an honorary doctor of science degree by Laval University during the 38th Annual Conference of the Chemical Institute of Canada.

W. D. SHILTS, presently associated with the president's office at the Goodyear Tire & Rubber Co., was recently awarded a service emblem commemorating fifty years of continuous association with the company.

RALPH S. WOLFE has been named purchasing agent of the Inland Manufacturing Division of the General Motors Corp., Dayton, Ohio, succeeding DAVID HAGANS, who has retired. JOHN F. BARSTOW has been named assistant purchasing agent.

RALPH S. WALKER has been transferred from the H. O. Canfield Co. to a subsidiary company, Virginia Rubber Corp., Clifton Forge, Va., where he will serve as chief chemist.

WALTER E. SHIVELY, manager of engineering tire development at the Goodyear Tire & Rubber Co., was recently presented with a service pin marking forty years of continuous service with the company.

ELMER L. LIDSETH, president of the Cleveland Illuminating Co., has been elected a member of the board of directors of the B. F. Goodrich Co., Akron, Ohio.

MELVIN G. KRAMER, formerly of the president's office at the Goodyear Tire & Rubber Co., Akron, Ohio, has been named manager of quality control at the company's plant at Gadsden, Ala.

EDWARD M. KRECH, director of purchases for the J. M. Huber Corp., has been elected president of the Purchasing Agents Association of New York.

G. DANIEL DAVIS, associated with the Nopco Chemical Co., Harrison, N. J., since 1916, has been named executive vice-president of the company.

WILLIAM P. DRAKE, formerly executive vice-president of the Pennsylvania Salt Manufacturing Co., Philadelphia, Penna., has assumed the presidency of the company succeeding GEORGE B. BIETZEL. Mr. Bietzel continues as a member of the board and as chairman of the board of the Pennsalt International Corp., a subsidiary.

JOHN E. KALLGREN, plant manager of the Seiberling Rubber Co., was recently installed as president of the Akron District of the Society of Professional Engineers.

L. G. MURRAY, associated with the Aetna-Standard Engineering Co. since 1937, has been named manager of export sales.

GLENN KOGER, manager of the Torrance, Calif., plant of the Rome Cable Corp., has been elected a vice-president of the company.

PAUL M. BIGLEY, associated with the Wyandotte Chemicals Corp. for the past thirty-seven years, has been named product manager for alkalies, chlorine and carbon dioxide for the Michigan Alkali Division.

JOHN K. CHAMBERS has been named manager of product development of the Seamless Rubber Co., New Haven, Conn.

Holmes Joins American Synthetic

Joseph W. Holmes

Joseph W. Holmes, formerly director of sales of the Jefferson Chemical Co., a subsidiary of the American Cyanamid Co. and the Texas Co., has been appointed sales manager of the American Synthetic Rubber Corp., New York, N. Y. A graduate of McGill University, Mr. Holmes has had wide marketing experience with synthetic rubber on this continent and in Europe. Mr. Holmes was previously manager of sales and technical service and executive assistant to the president and managing director of the Polymer Corp., Sarnia, Ont., Canada. Before joining Polymer, Mr. Holmes handled sales of rubber chemicals, neoprene and carbon black for Canadian Industries, Ltd.

LEONARD K. FIRESTONE, president of the Firestone Tire & Rubber Co. of California, has been elected to the board of trustees of the Air Pollution Foundation, the independent, scientific research organization with headquarters in Los Angeles, Calif.

RAYMOND C. FIRESTONE, executive vice-president of the Firestone Tire & Rubber Co., has been honored by the Extension Service of the U. S. Department of Agriculture for his distinct contributions to the nationwide development of the 4-H Club program.

BRIGADIER GENERAL WEBSTER ANDERSON has been appointed commanding general of the Philadelphia Quartermaster Depot, Philadelphia, Penna., succeeding MAJOR GENERAL R. P. HOLLIS.

ALVAN CAMPBELL, JR., associated with the Thermoid Co., Trenton, N. J., since 1938, has been elected a vice-president.

M. J. Ross has been named manager of export trade for both the Quaker Rubber Corp. and the Watson-Stillman Co. Both companies are divisions of the H. K. Porter Co., Inc.

S. B. SCOTT, associated with the Wyandotte Chemicals Corp., Wyandotte, Mich., since 1942, has been named director of sales for the Michigan Alkali Division.

Heat Resistance Studies

Two reports of government-sponsored research directed toward the improvement of the heat and fluid resistance of rubber compounds are available to industry by the Office of Technical Services, U. S. Department of Commerce. One of these is a report of a Wright Air Development Center project to develop a rubber compound suitable for use in rubber seals, hose, and gaskets in the hydraulic systems of supersonic piloted aircraft which would withstand operating temperatures of —65 to 400°F., as well as the environmental extremes to which such aircraft are subjected. The other is a literature survey, by the Rock Island Arsenal, of studies showing how high-energy irradiation may be used to improve the oil and heat resistance and aging characteristics of a number of rubber compounds.

The first report, "Development of a Rubber for Service in Contact with Experimental Hydraulic Fluids at 400°F.," is priced at 50 cents. Order PB 111598. Best results reportedly were obtained with compounds of Neoprene WRT aged in silicate ester base hydraulic fluid. The other report, "High Energy Radiation of Polymers, A Literature Review," is also priced at 50 cents. Order PB 111529. Particularly good results from experiments with polyethylene, which after irradiation could withstand temperatures of 250°C. and above, indicate that heat resistance of other rubbers may be improved by this method.

U. S. Appeals in DuPont Case

On June 15, the U. S. Justice Department appealed to the Supreme Court to reinstate its civil anti-trust case against E. I. du Pont de Nemours & Co., Inc., and General Motors Corp. The appeal sought reversal of a decision by U. S. District Judge Walter J. LaBuy in Chicago last December 3, that the government had failed to prove its anti-trust charges. Judge LaBuy dismissed the case. In the action—described as the biggest anti-trust case in U. S. history—the government had asked Judge LaBuy to force the DuPont family to dispose of their stock interests in General Motors and U. S. Rubber. Judge LaBuy ruled the Justice Department had "failed to prove conspiracy, monopolization, a restraint of trade, or any reasonable probability of a restraint." The Justice Department said its appeal would challenge only the conclusions on the DuPont-General Motors phase of the case. Its 24-page printed appeal said that "in the light of admitted facts, we submit that the District Court's finding that since the 1920's DuPont has not had, and today does not have practical or working control of General Motors is patently erroneous because it ignores the realities of intercorporate relations."

Lower maintenance costs and more light transmission are obtained through the use of translucent rigid Geon vinyl plastic windows in a section of the Port Neches, Texas, plant of Goodrich-Gulf Chemicals, Inc.

Fli-Back Promotes Klug

Edward R. Klug

J. E. Gibson, Sr., president and general manager of Fli-Back Co., Inc., High Point, N. C., has appointed Edward R. Klug as general plant superintendent in charge of all production of rubber and wood products effective June 1. Mr. Klug, formerly a resident of Ohio, has lived in High Point for approximately five years. He came with Fli-Back as technical superintendent of rubber ball production. In 1954, he accepted the supervision of latex dipping departments. He has been identified with the rubber industry for about forty years and is recognized as one of the leading technical experts in the nation for the production of chemically blown sponge rubber products.

Rubber-Paved Jet Air Base

Over 365,000 tons of asphaltic concrete and tar rubber will be required to surface the aprons and runways of the multi-million dollar Homestead, Fla., Air Force Base. When completed in the fall, the jet field will have some of the longest runways in the world. In addition to the large quantity of material being laid, an interesting feature of the paving job is the use of tar rubber, which is being furnished by the Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. This material is being used because it forms a surface which is not affected by jet fuel. For this reason, 1,000 feet of each end of the runways and the entire surface of the aprons will be covered with tar rubber. Remaining sections of the runways will be government specification asphaltic concrete.

Vinyl Film Fashion Show

A large collection of vinyl film rainwear, shower curtains, closet accessories, tablecloths, draperies and nursery items were displayed at the first industry-wide fashion show and exhibit sponsored by the Society of the Plastics Industry, Inc., on June 22 at the Hotel Pierre in New York, N. Y. Unusual in presentation as well as in the variety and number of products exhibited, the fashion show included dance pantomime, and musical background with Vyvyan Donner, well-known commentator of television and newsreels, acting as mistress of ceremonies.

Harlex 300 Polymeric Plasticizer

"Harlex 300," a new, high molecular weight, polymeric plasticizer is being offered in commercial quantities by the Harchem Division of Wallace & Tiernan Inc., 25 Main St., Belleville, N. J. Having a typically low volatility factor, Harlex 300 is said to provide lower temperature flexibility in plasticizing vinyl resins than any of the other true polymeric plasticizers. It has excellent heat and light stability and extraction resistance. Being a true polymeric plasticizer, it has outstanding nonmigratory characteristics, the company states. The solvency of Harflex 300 is much higher than is typically the case with the true polymerics and, in part, accounts for its very high efficiency. Being of high solvency it is very easily handled in compounding. It incorporates readily in calendering or extruding. Also because of this efficiency and solvency it is claimed that it is the only true polymeric type plasticizer capable of being dry blended and used in plastisols in formulations where it is the sole plasticizer. The fact that Harflex 300 can be used as the sole plasticizer makes it possible to incorporate all of the outstanding characteristics of the true polymeric plasticizer without sacrificing these features to the shortcomings of the monomeric type of plasticizer with which it has been necessary to blend to provide ease of processing, efficiency and low temperature flexibility. Harflex 300 is a moderately mobile liquid very light in color and possessing no odor.

Off-the-Road Tubeless Tire

A complete line of wide base, low-pressure tubeless off-the-road tires will be marketed soon by the B. F. Goodrich Co., it has been announced by Arthur Kelly, president of the company's Tire & Equipment Division. Mr. Kelly reports that tires of this type have seen service in every section of the country and in foreign countries for the past two years and have delivered remarkable service. Forerunner of the line was an all-nylon 65-inch off-the-road tubeless tire, said to be the first tubeless off-the-road tire. This tire, designed for high flotation, features a modified traction tread and has found use on various types of off-the-road equipment, including tractors, bulldozers, scrapers, and other earth-moving equipment. This first tubeless off-the-road tire was developed by Goodrich engineers who worked closely with R. G. Le Tourneau, president of the heavy equipment manufacturing firm which bears his name. Their efforts resulted in the high flotation tubeless which was tested extensively on Le Tourneau equipment. This was the first off-the-road tire designed specifically to operate at low pressure to provide maximum flotation in soft dirt and sand and under operating conditions where flotation as well as traction is a major problem.

Merix Chemical Co., Chicago, Ill., has announced "Stabilite", a new type of ultraviolet light absorbing chemical to prevent ultra-violet light-caused darkening or color changes and remove static electricity on all types of plastics.

Hoover Elected to MCA Post

John R. Hoover, president of the B. F. Goodrich Chemical Co., was elected chairman of the board of directors of the Manufacturing Chemists' Association, Inc., at its 83rd annual meeting in White Sulphur Springs, West Va. Mr. Hoover succeeds Fred J. Emmerich, president of Allied Chemical and Dye Corp. Mr. Hoover was elected a director of MCA in 1953 for a three-year term and in 1954 became a member of the MCA executive committee. He had previously served two years as president of the Plastic Materials Manufacturers Association, an organization now merged with MCA. He is also vice-president and a director of Goodrich-Gulf Chemicals, Inc., a company jointly owned by Goodrich and Gulf Oil Corp. In other business, the association re-elected William C. Foster as full-time president and a director. William H. Ward, vice-president of E. I. du Pont de Nemours and Co., Inc., was elected chairman of the Executive Committee. Howard S. Bunn, vice-president of Union Carbide and Carbon Corp., was re-elected as vice-president, and J. Albert Woods, president of Commercial Solvents Corp., was named to the other vice-presidential post. M. F. Crass, Jr., full-time secretary-treasurer, was also re-elected.

Directors elected for a term expiring May 31, 1958, are Elton W. Clark, vice-president of Allied Chemical and Dye Corp., Ernest Hart, executive vice-president in charge of chemical divisions of the Food Machinery and Chemical Corp., John A. Hill, president of Air Reduction Co., Inc., John E. McKeen, president of Charles Pfizer and Co., Inc., George L. Parkhurst, chairman of the board of the Oronite Chemical Co., Robert B. Semple, president of Wyandotte Chemicals Corp., Kenneth C. Towe, president of American Cyanamid Co., O. V. Tracy, president of Enjay Co., Inc., and Robert I. Wishnick, president of Witco Chemical Co. Thomas S. Nichols, president of Olin Mathieson Chemical Corp., was re-elected a director for the term expiring May 31, 1956.

General Cable Acquires Firm

General Cable Corp., New York, N. Y., has acquired General Insulated Wire Works, Inc., of Providence, R. I. J. R. MacDonald, president of General Cable, said the acquisition adds a new line of products, including rubber, neoprene and plastic power supply cords with molded-on rubber or plastic attachment plugs and devices, electrical cord sets and other power cords. J. C. Craig, president of General Insulated Wire Works, will become a vice-president of General Cable, with principal responsibility for the Providence operation. Mr. MacDonald also announced completion of arrangements with the Canada Wire and Cable Co., Ltd., for the formation of a new company to manufacture a complete line of telephone wires and cables in Canada. Telecables and Wires, Ltd., the new company, will be jointly owned by General Cable, Canada Wire & Cable, and the British Telegraph Construction and Maintenance Co. Canada Wire and Cable will operate the new company, expected to be located in or near Winnipeg.

Coming Events in the Rubber Industry

July 22. Chicago Rubber Group, Golf Outing, St. Andrews Golf and Country Club, West Chicago, Ill.

July 28. New York Rubber Group, Golf Tournament, Shackamaxon Country Club, Scotch Plains, N. J.

Aug. 19. Philadelphia Rubber Group, Summer Outing, Manufacturers' Country Club, Oreland, Penna.

Sept. 17. Connecticut Rubber Group, Summer Outing.

Sept. 22. Southern Ohio Rubber Group, Fall Meeting, Engineer's Club, Dayton, Ohio.

Sept. 23. Northern California Rubber Group.

Sept. 25. Northern California Rubber Group, Annual Family Summer Outing.

Sept. 29. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Oct. 4. Buffalo Rubber Group, Fall Meeting, Hotel Westbrook, Buffalo, N. Y.

Oct. 4. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Oct. 7. Chicago Rubber Group.

Oct. 7. Detroit Rubber and Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 7. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 14. Boston Rubber Group, Fall Meeting, Somerset Hotel, Boston, Mass.

Oct. 14. Northern California Rubber Group.

Oct. 28. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 28. Philadelphia Rubber Group, Fall Meeting, Poor Richard Club, Philadelphia, Penna.

Nov. 1. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Nov. 2-4. Division of Rubber Chemistry, A.C.S., Fall Meeting, Bellevue-Stratford Hotel, Philadelphia, Penna.

Nov. 3. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 10. Northern California Rubber Group.

Nov. 11. Chicago Rubber Group.

Nov. 13-18. American Society of Mechanical Engineers, Diamond Jubilee Annual Meeting, Hotel Congress, Chicago, Ill.

Nov. 18. Connecticut Rubber Group, Fall Meeting.

Dec. 1. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 7. Buffalo Rubber Group, Xmas Party, Buffalo Trap and Field Club, Buffalo, N. Y.

Dec. 9. Detroit Rubber and Plastics Group, Annual Christmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 9. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 10. Southern Ohio Rubber Group, Xmas Party, Miami Valley Golf Club.

Dec. 16. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Dec. 16. Chicago Rubber Group.

Dec. 16. Los Angeles Rubber Group, Xmas Party, Ambassador Hotel, Los Angeles, Calif.

Constructing Research Building

Goodyear Aircraft Corp., Akron, Ohio, has announced plans for the construction of a new engineering and research building in Akron at a cost of $3,000,000. The new building will be of three-story modern concrete and steel construction, 400 feet by 125 feet, completely air conditioned and equipped with the latest instruments and facilities for research and development of new products in the fields of aerophysics and electronics. Modernization and improvement of some of the company's other facilities are also scheduled within the next few months. It is planned to have the new building ready for occupancy by the summer of 1956.

New Rubber-Covering Technique

A method of applying rubber covering to metal castings and holding such covering to specific parallel depths has been reported by the Willow Run Rubber and Lining Co., Belleville, Mich. The company states that it is now employing application techniques and bonding methods that enable it to hold a rubber covering or lining thickness on a cast iron plate to within plus or minus .004-inch of being parallel. It is stated that the stability of parallels and maintenance of close tolerance are possible through the company's development of special bonding agents, equipment, and close control of the rubber compounds employed.

Laticrete Flooring Material

Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn., has developed a new concrete-type industrial flooring and construction material that "gives" without cracking under heavy loads, dampens shock and noise, resists alkalies and mild acids, is waterproof and has a nonslip quality. The material is a combination of liquid rubber and a special cement powder and is called "Laticrete." The rubber content makes it so flexible when hard that a long, thin slab can be bent into a circle by hand, the company states. The rubber also gives the cured mix "bounce" and a tight bond that makes it resist breakdown under heavy use. Test patches in factories show virtually no wear after two years of high-volume traffic. The concrete-rubber mix is a surface coating and can be used for repair work or in new installations. It has good adhesion to concrete, metal and even glass. A quarter-inch layer, the suggested thickness, will support heavy loads such as fork lift trucks when put down over a hard base. Laticrete comes in two parts—the powder and a liquid rubber—and is prepared like regular concrete. Standard masonry equipment is used both to mix and apply it. One of the few requirements in using it, is that it must be applied to a clean surface. Dust, oil and other foreign matter prevent a bond to the base material. Any acid on the surface to be coated must be neutralized before putting down the surfacing material. Otherwise it is handled like concrete or mortar and can be trowelled or buffed to give a smooth surface.

Acrysol G-110 Thickening Agent

A new thickening agent, called "Acrysol G-110," designed for use with many commonly-used synthetic latices, is now available from the Resinous Products Division, Rohm & Haas Co., Philadelphia, Penna. When used in concentration ratios of 1% or less, Acrysol G-110 is from 3 to 20 times more effective—as measured by the viscosity of the final latex composition—than currently available thickeners, the company states. The new thickening agent, an ammonium polyacrylate solution, is suggested for use with certain commercial latex formulations of the following type: butadiene-styrene, unplasticized styrene, vinyl chloride and vinyl acetate. The degree of thickening for a given concentration ratio depends on the specific polymer used. Latices thickened with Acrysol G-110 have excellent storage stability, and do not undergo phase separation or creaming. The viscosity of such formulations remain constant with aging, and is not affected by high pH values and elevated temperatures. Furthermore, the thickener may be used without difficulty in the presence of sodium, calcium and magnesium salts. Suggested applications are in the manufacture of dipped, cast or molded goods, adhesives, and cements such as those used for combining rug backing and pile fabrics, and in spraying, brushing and extruding compounds.

Thermoid Co., Trenton, N. J., is offering an illustrated "Hose Check List" printed on stiff cardboard and designed for hanging in plant areas where hose is used.

Named Compo Research Director

Stanley O. Ames

Stanley O. Ames, formerly chief chemist of the Compo Shoe Machinery Corp., Boston, Mass., has been appointed director of chemical research for the parent corporation and its subsidiary, Compo Chemical Co., Inc., of Mansfield, Mass. Mr. Ames has been associated with Compo as chief chemist for the past five years. A graduate of Northeastern University, he is a member of the American Chemical Society, American Society for Testing Materials, Technical Association Pulp and Paper Industries and the Boston Rubber Group. As director of research, he will coordinate all research, market development and quality control for the corporation's line of shoe adhesives, industrial adhesives, coatings, saturants and laminants.

Abandon Merger Negotiations

Plans for a merger of A. G. Spalding & Bros., Inc., Chicopee, Mass., and American Machine & Foundry Co., New York, N. Y., have been abandoned. Following a complete study of Spalding by AMF, and thorough consideration of proposals by Spalding directors, it was mutually decided that terms acceptable to both could not be agreed upon and negotiations were terminated. AMF had proposed to acquire Spalding's assets by exchange of ¾-share of AMF for one share of Spalding. W. B. Gerould, Spalding president, said: "The plans for expansion and diversification of our business, upon which management has been working for some time, are now maturing."

Assigned New Territory

Duncan K. Law will take over the northern New Jersey territory for the Stanley Chemical Co. of East Berlin, Conn., a subsidiary of the Stanley Works, according to an announcement by Arthur B. Sherry, sales manager. Since joining Stanley in 1950, Mr. Law spent three and one-half years in the sales office and was subsequently appointed sales representative in western Massachusetts and Vermont. Born in New Britain, Conn., Mr. Law attended Middlebury College in Vermont, and during World War II served as a 2nd Lieutenant in the U. S. Air Force.

Laying New Telephone Cable

The laying of the world's first transoceanic telephone cable began on June 22 when a British cable ship started laying cable from Clarenville, Newfoundland, to Oban, on the west coast of Scotland. This cable will carry the eastgoing part of telephone conversations. Next summer, the ship will lay the cable for the westgoing portion. The trans-Atlantic cables will span a distance of 2,250 miles and will be 2,372 miles long. With thirty-six circuits, the two cables together will handle up to thirty-six simultaneous conversations. The new cable is being laid as a result of negotiations between the American Telephone and Telegraph Co., the Canadian Overseas Telecommunication Corp., a government agency, and the British Post Office, which operates telephone service in the British isles. The special cable for the huge project was manufactured by the Simplex Wire & Cable Co. of Cambridge, Mass., and Submarines Cables, Ltd., Greenwich, England. The core is a flexible copper tube about five-eighths of an inch in diameter containing a single conductor surrounded by polyethylene. With the addition of other protective coverings of jute and armoring wire, the over-all diameter reaches an inch and a quarter. The cable weighs about a pound a foot. In the shallow waters near shore, where greater protection is required, the cable will be more than two and one-half inches in diameter and weigh almost nine pounds a foot. The cores of both cables are the same.

Introduces Paraplex G-61

Rohm & Haas Co., Philadelphia, Penna., has introduced "Paraplex G-61," a new plasticizer which should be considered for all vinyl applications currently employing "Paraplex G-60." Like G-60, G-61 is an effective stabilizing plasticizer for vinyl-type polymers, providing exceptionally good heat and light durability in combinations with cadmium and cadmium-barium stabilizers. The product shows the following physical properties:

Acid Number — mgm. KOH/gm	—1.0 max.
Color (Varnish Scale)	—2.0 max.
Viscosity (Poises, 25°C.)	—2.5—3.5
Specific Gravity	—0.995
Solidification Temperature	—0—+5°C.

Constructing Office Building

Goodrich Chemical Co., has announced plans for construction of a three-story air-conditioned office building at 3135 Euclid Avenue in Cleveland, Ohio. John R. Hoover, company president, said the building will be erected and leased to Goodrich Chemical as sole occupant. It will measure 90 by 147 feet and have a gross area of 52,000 square feet, including basement. Construction was to start in June and the building will be ready for occupancy about May 1, 1956. The company will move its headquarters offices from its present location in the Rose Building in Cleveland.

Experimental Silicone Tire

U. S. Rubber Co., New York, N. Y., and the Dow Corning Corp., Midland, Mich., have jointly developed a new experimental tire that will withstand a temperature range of nearly 600°F. This is said to be the first tire in which silicone rubber and glass fibers have been successfully combined. The new tire, designed for highly specialized use, will withstand temperatures from —90 to plus 500°F., far below and above the limits of materials commonly used in tire construction. Commercial application to automotive vehicles is unlikely at this time due to high cost of materials. However, tires of this nature may be especially suitable for high speed super-sonic aircraft where the tires may be exposed to temperatures in the 400 to 500°F. range. At these temperatures, ordinary aircraft tires in retractable wheels would disintegrate due to excessive heat.

The materials used in the new tire, excluding the bead wire, are new to the tire industry. The glass fibers and wires are specially coated with a silicone adhesive. The ply skimcoating, treads and sidewalls are made of "Silastic", the Dow Corning silicone rubber. The tires, constructed by the Detroit, Mich., plant of U. S. Rubber, are molded in a conventional tubeless tire mold. Vulcanization is completed by Dow Corning at Midland in a hot air oven at temperatures ranging from 450 to 500°F. The extremely high temperatures are necessary to develop the best physical properties of the silicone. The finished tire is a pink orange in color and is translucent to the extent that the outer ply can be seen through the sidewall. Both Dow Corning and U. S. Rubber state that these tires are still in the experimental stage and much work is yet to be done, but they add that this new material may be the answer for tires which must be exposed to high temperatures.

Heads Rubber Purchasing

Perry S. Odell has been appointed head of the Rubber Purchasing Division of the U. S. Rubber Co., New York, N. Y., succeeding Edward C. Schwab, who died on March 31. Mr. Odell has been a rubber buyer for the past 14 years and before that was a banker. He graduated from Wesleyan University, where he majored in economics, in 1932. For the next nine years he was in banking, working in both domestic and foreign branches. He was then a coffee buyer for a brief period before becoming a rubber buyer for a gum concern in 1941. In 1942 he joined U. S. Rubber as a rubber buyer and five years later was named assistant to the head of the Rubber Purchasing Division. In his new post he will supervise buying of all natural, synthetic, reclaimed and scrap rubber and rubber latex.

Roca-Guix Changes Name

As of March 22, 1955, the firm of Roca-Guix, S.A., Barcelona, Spain, suppliers of machinery and equipment to the rubber and plastics industries, changed its name to Guix, S. A. Enrique Guix Pujadas is general manager of the company, which recently increased its working capital.

FINANCIAL BRIEFS

Eight stockholders of Wooster Rubber are planning to sell 169,200 shares of their stock according to a registration statement filed with S. E. C. The selling stockholders include Errett M. Grable, board chairman, and Horatio B. Ebert, vice-president, and their wives, and James R. Caldwell, president.

Sales of Rome Cable for the quarter ending June 30 are running over 20% ahead of the like period a year earlier and earnings should reflect an even greater improvement, H. T. Dyette, chairman, told stockholders at the recent annual meeting in Troy, N. Y. Mr. Dyette said earnings at present show an improved tendency and prices on insulated wire products are firmer.

Dayton Rubber's $3,000,000 offering of 15-year, 4% convertible subordinated debentures is now on the market. Lehman Brothers and associates have priced the securities at 102½ and accrued interest. For conversion purposes, the company will value its common at $23 a share. Equitable Life Assurance Society of the United States took the note.

Goodyear and Firestone were among the nation's top 100 national advertisers in newspapers last year, according to *Editor and Publisher*. Goodyear, which spent $2,267,630 for this purpose, ranked 33rd. Firestone's expenditures totaled $949,585 in newspapers and was 96th. As usual, the big three of the automobile industry, General Motors, Ford and Chrysler, topped the list in that order. In 1954, Goodyear increased its newspaper spending by 38.5%, and Firestone increased 27.8% over 1953. Outside of the top 100 in newspaper advertising expenditures were Goodrich with $735,000, U. S. Rubber with $647,392, and General Tire with $195,264.

Mansfield Tire & Rubber Co. estimates that its over the counter sales this year will climb to $68,500,000 from $50,400,000 in 1954, and pre-tax earnings will rise to $3,300,000 from $1,700,000. Pending the successful completion of a five-year construction and diversification program, Mansfield anticipates sales of $100,000,000 by 1960, of which it expects to retain 6% in pre-tax profits.

Karl Fox on European Tour

Recently we had occasion to comment on some of the hidden talents possessed by members of the rubber fraternity. We have just learned of another of these "hidden talents." Karl M. Fox, well-known consulting research chemist who makes his headquarters at 300 Yale Ave., Swarthmore, Penna., is a member of the Chancel Choir of the Presbyterian Church of Swarthmore. The choir is making a four-week goodwill tour of Europe this summer for the betterment of international and Christian relations. Some thirty-four selected members of the choir, including Mr. Fox, will make the tour and will give concerts in Holland, Germany, Switzerland, Italy and France.

Tubeless Tire-Rim Standards

The Standards Committee of the Tire and Rim Association, Akron, Ohio, has approved a technical standardization program on tubeless truck and bus tires and rims. Tubeless truck and bus tires will be made in sizes up to and including the tire that replaces the present 11.00 cross-section, for mounting only on new type, one-piece drop center rims. In all sizes above the replacement for 11.00 cross-section, the multiple piece rim, employing a sealing ring or gasket, will be used. It was stated that the new program is a long step forward in bringing to the trucking industry the advantages of tubeless tires. By eliminating the tube and flap and all troubles usually associated with them, one of the major sources of tire trouble will be permanently removed. Lighter weight, cooler running, more trouble-free wheel assemblies can be expected. Approved technical standards will now make it possible for all manufacturers to proceed with tooling for volume production. The Rubber Manufacturers Association states that leading tire manufacturers have advised that specialized applications such as high load and low platform trailer tires will continue to be used with tubes, pending further development. Conventional truck and bus tires with tubes will continue to be manufactured by the industry. A caution was voiced that only very limited quantities of the new tubeless truck tires and rims for additional testing and evaluation by truck owners will be available in the near future.

Flexol Plasticizer 10-10

"Flexol" plasticizer 10-10 (didecyl phthalate) is now available in tank car quantities from Carbide and Carbon Chemicals Co., New York, N. Y. More than five years of planning and construction effort went into Carbide's new Oxo unit at Texas City, Texas, to make the decyl alcohols available for the production of this new plasticizer, the company states. "Flexol 10-10" is said to be the least volatile of the commercially available phthalate plasticizers. In addition to low volatility, Flexol 10-10 has improved resistance to water extraction and plasticizer "rub-off." In plastisols, 10-10 contributes better viscosity stability. Excellent heat and light stability, good electrical properties, and all the other advantages of phthalate plasticizers are inherent in 10-10. All segments of the vinyl plastics industry can use Flexol plasticizer 10-10, particularly in applications that require low volatility. Some of the products in which 10-10 can be used are profile extrusions, coated fabrics, calendered film and sheeting, electrical insulation, and plastisols for slush-molding or dip-molding.

Haworth Receives New Post

J. P. Haworth, formerly associated with the research and engineering affiliate of the Enjay Co., Inc., New York, N. Y., has been appointed assistant to the sales manager of the recently formed Butyl Division of Enjay. Mr. Haworth will be in charge of technical services in connection with the use of Enjay Butyl and market development in the tire field.

V-Belt Manufacturing Method

An electronic method of making rubber V-belts has been developed by the U. S. Rubber Co., New York, N. Y. The new method is said to produce belts with almost complete freedom from vibration and greater uniformity than ever before. Belt stretch and shrinkage, critical factors in many applications, are closely controlled by the new production method. Vibration, especially serious in drives where outside idlers or pulleys are used, is either eliminated or reduced to a negligible point. Pulley wearing due to vibration is eliminated and noise and whip are reduced, the company states.

The most important part of a V-belt is the pulling member, usually textile cord. It is vital that all the strands of cord in each V-belt be under the same tension to insure their carrying an equal share of the load in service. In conventional production methods, the pulling member is applied by essentially mechanical tensioning systems which suffer from a built-in time lag. In addition, these systems have a series of pulleys which introduce tensions that are uncontrollable and have a tendency to rupture or damage the pulling member. Under these conditions, there are frequently one or two strands that are wound tighter or looser than the others.

With U. S. Rubber's new device, the tension at which the pulling member is applied is controlled electronically with an exactness not possible with conventional means, the company states. The company has electronically combined the component parts of the belt building equipment to operate as a single unit at maximum efficiency. This means that the cord is delivered under the same tension at all speeds with automatic compensation for any machine variations. Every strand of cord in the finished V-belt is under the same tension and shares the load equally.

Goodrich Chemical Appointments

Two managerial appointments in the general chemical sales department of the B. F. Goodrich Chemical Co., Cleveland, Ohio, were recently announced. L. R. Modlin, Jr., has been named manager of general chemicals sales, replacing R. P. Kenney, who recently became European director of chemical activities for the B. F. Goodrich Co. J. S. Wolff, formerly biochemical sales development manager, has been appointed Mr. Modlin's successor as field sales manager for the department. Mr. Modlin was graduated from Wake College with a B. S. in chemistry and received his Ph. D. in organic chemistry from the University of Virginia in 1941. He joined the B. F. Goodrich Co. in 1942, and was transferred to Goodrich Chemical in 1945. Mr. Wolff received his B.S. in chemical engineering from Carnegie Institute of Technology in 1940 and served in the U. S. Army for five years before joining Goodrich Chemical in 1946.

Tyson Appoints C. P. Hall

Tyson Corp., Woodbridge, N. J., has appointed the C. P. Hall Co., Akron, Ohio, as sales agent east of the Rocky Mountains for the sale of vulcanized vegetable oils and specialty products for the rubber industry.

Elected Texas-U. S. Chairman

Ernest G. Brown

Ernest G. Brown, vice-president of the U. S. Rubber Co., New York, N. Y., has been elected chairman of the board of directors of the Texas-U. S. Chemical Co. He will succeed John P. Coe, who retired on June 30. Mr. Brown relinquished his post as general manager of the Mechanical Goods Division of U. S. Rubber, but will continue as a vice-president. Texas-U. S. Chemical is owned jointly by the Texas Co. and U. S. Rubber. It owns and operates a synthetic rubber plant and has an undivided one-half interest in a butadiene plant in Port Neches, Texas. Mr. Brown joined U. S. Rubber in 1929 in its central planning and engineering departments in New Haven, Conn. He was made factory manager of the company's Bristol, R. I., plant in 1931 and production manager of the Mechanical Goods Division in 1941. During World War II, he served as general manager of the company's Munitions Division. He was made general manager of the Mechanical Goods Division in 1944 and became a vice-president in 1945. Mr. Brown was graduated from the Sheffield Scientific School of Yale University in 1916. In 1920-21, he attended the Harvard Graduate School of Business Administration.

Announces Advastab 48-79

Advance Solvents and Chemical Corp., New York, N. Y., has announced the availability of a new cadmium stabilizer, "Advastab 48-79" (formerly XC-79). The company states that tests have shown that the product, when incorporated in a clear garden hose formulation, shows less tendency to absorb water than other cadmium stabilizers. Outdoor exposure tests indicate an equivalent or better performance than other cadmiums, the company declares. Fadeometer tests indicate over 1200 hours without discoloration. A clear liquid in form, the product has an LA (Gardner) viscosity at 25°C., and a specific gravity of 1.133 at 20°C. It has a refractive index of 1.553 at 20°C., and weighs 9.5 pounds per gallon.

Any changes in the information submitted for the 1955-56 RUBBER RED BOOK? Notify us today!

Goodrich Pressure-Sealing Strip

A patent covering an inflatable rubber strip that seals bubble-type cockpit canopies of high altitude military airplanes has been granted to the B. F. Goodrich Co. by the U. S. Patent Office. It is said that the rubber strip overcomes one of the most difficult problems of high altitude flight. The strip conforms to the edges of a canopy and, when inflated, seals the space within the canopy and cockpit. Normal, safe air pressure is maintained regardless of outside pressure at any altitude. Rugged yet flexible in construction, the new inflatable seal is designed to prevent high altitude blowouts which endanger the lives of airmen due to the sudden reduction in air pressure within the canopy and cockpit. The extra high lift ratio of the new seal permits more clearance for the adjustable canopy. When deflated, the wall of the strip sinks back into the channeled base, allowing the canopy to be quickly opened without sliding and scuffing damage to the rubber. Special textile fabric, rubber-coated on both sides, is vulcanized to a flexible rubber channel-type base. Inflated, the rubberized fabric wall rises to its sealing position with little or no stretching of the rubber. Sealing is practically instantaneous. Special rubber compounds used stay "live" and resist weather aging. Operation in extremes of temperatures meets U. S. Air Force specifications and approval for the most advanced types of fighting aircraft. Design of the inflatable strip seal can vary to suit each airplane model. The new inflatable strip is also applicable as a weather seal between fuselages and detachable cargo pods of transport aircraft and for water seals in amphibious vehicles.

Appoints Two New Directors

Election of two new directors of Witco Chemical Co., Ltd., of London (and Manchester), England, has been announced by Robert I. Wishnick, chairman of the board of directors of Witco Ltd., and president of the associated American firm, Witco Chemical Co. The new directors are Max A. Minnig, executive vice-president and director of sales of Witco Chemical, and John A. White, export manager of Witco Chemical Co., Ltd. Mr. Minnig successively has been sales manager for rubber chemicals, director of sales, as well as vice-president since joining the American company in 1946. Mr. White has concentrated on the sale of carbon black to the rubber, printing ink and paint industries in England and on the continent. Associated with Witco Ltd., for many years, he has an extensive background in industrial sales.

Hodgins Named to BDSA Post

Theodore S. Hodgins, vice-president in charge of the Pacific Northwest Division of Reichhold Chemicals, Inc., has been named director of the Chemical and Rubber Division of the Business and Defense Services Administration, Washington, D. C. Mr. Hodgins took office July 1. He is the sixth director of the agency since its formation. Like his predecessors, he will serve a six-month term.

News in Brief

Glutex Inc., Brooklyn, N. Y., is manufacturing a new-type adhesive called "Glutak" which is said to bond paper effectively to wood, glass, metal, acetates, plastics, tile, leather and other surfaces.

Chemical Service Corp., 82 Beaver St., New York 5, N. Y., has taken additional space at their present location.

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio, has issued a Hycar Technical Newsletter (Vol. IV, No. 3) on "Hycar 2202".

Minnesota Rubber and Gasket Co., 3630 Wooddale Ave., Minneapolis 16, Minn., has isued a 10-page folder discussing Quadrings—their composition, specifications, applications and advantages.

Stauffer Chemical Co., New York, N. Y., has announced plans for construction of a new multi-million dollar plant for the production of carbon bisulphide at Mobile, Alabama.

Emulsol Chemical Corp., 59 East Madison St., Chicago 3, Ill., has published a bulletin entitled "The Fatty Alkanolamides —Emcol 5000 Series." Write for Technical Bulletin No. 44.

Parker Appliance Co., Cleveland, Ohio, has added rubber-covered single fiber braid (non-metallic) hose for low pressure service to its line. Brass re-usable fittings are also available.

Aetna-Standard Engineering Co., Frick Bldg., Pittsburgh 30, Penna., has released an eight-page product information bulletin on "Nodular Iron for Rolls and Castings."

Bellofram Corp., 144 Moody St., Waltham 54, Mass., has issued a 16-page, loose-leaf catalog describing various classes of Bellofram long-stroke, deep convolution diaphragms. Write for Catalog B.F. 150.

U. S. Fiber Glass Co., Norwood, N. J., is manufacturing a lightweight window flower box of glass fibers and Vibrin polyester resin that is said not to warp, crack, peel or be affected by soil acids.

Argus Chemical Corp., Brooklyn, N. Y., has announced a price reduction of 4c per pound on the company's low temperature epoxy plasticizer, "Drapex 3.2."

Automotive Rubber Co., Inc., Detroit, Mich., has issued a brochure describing its recently developed "Arco-Cel" sponge rubber. Copies available from the company.

Claremont Pigment Dispersion Corp., Brooklyn, N. Y., has issued a bulletin listing prices and properties of the company's "4000" series of color paste concentrates. Request Technical Bulletin 130.

Collins & Aikman Corp., New York, N. Y., has named Pinebrook Fabrics, Inc., New York, N. Y., as distributor to the brassiere and corset industry for its foam-rubber backed fabrics bearing the "Candalon Foamcoat" trademark.

A free booklet describing the Upper Kanawha Valley of West Virginia and its industrial advantages is available from the Upper Kanawha Valley Development Association, Montgomery, W. Va.

Dayton Rubber Co., Dayton, Ohio, has prepared a Preventive Maintenance Manual for V-belt drives.

Antara Chemicals, a sales division of General Aniline & Film Corp., has issued the second edition of its catalog of products. Copies available from the company at 435 Hudson St., New York 14, N. Y.

"Bud" Wilson, Inc., Beverly Hills, Calif., is producing "Perma-Ice" bags filled with a special coolant that does the job of ordinary ice without the accompanying mess or bulk. The bags are made of flexible Krene.

Indoil Chemical Co., 910 So. Michigan Ave., Chicago 80, Ill., has published a pamphlet on "Indonex Plasticizers in Extruded Bumper Compounds."

Toscony Fabrics, Inc., New York, N. Y., is manufacturing a line of attractive decorator fabrics under the trademark, "Filmtex." The fabrics are coated with Krene plastic.

Adhesive Products Corp., New York, N. Y., has developed a new neoprene protective paint called "Apco," for metal, wood and ceramic surfaces.

Sandwiches of Hycar rubber and steel, shaped into strong, compact, vibration-damping brackets, are being used to support cabin pressurizing superchargers in Douglas Aircraft DC-6 and DC-7 airliners.

Lewis-Shepard Products Inc. has moved to 3730 Tennelle Ave., North Bergen, N. J. The new telephone numbers are: LAckawanna 4-3994 and UNion 4-7900.

U. S. Rubber reports that during the past three years, the increase in the number of women holding common stock has exceeded that of men by 3,509 to 2,335. There are now 10,234 women common stockholders to 9,174 men.

Rubba, Inc., New York, N. Y., has developed a peelable adhesive called "Rubbatex" for use in adhering ordinary paper labels to polyethylene containers.

Specially molded rubber parts made of Hycar are being used in the farm and dairy appliances manufactured by the De Laval Separator Co., Poughkeepsie, N. Y.

Dorr Co., of Stamford, Conn., and Oliver United Filters Inc., of Oakland, Calif., have merged under the name of Dorr-Oliver Inc., with headquarters at Stamford.

A new Koroseal diaphragm valve for handling slurries, fluids, gases and corrosive materials at temperatures to 150°F. and pressures to 150 pounds has been announced by Goodrich.

A giant 12½-foot-high chair made of Airfoam, with a mahogany frame and leather upholstery, has been put on display at the showroom of Bestever Upholsterers, Franklin Square, Long Island.

Wallpaper, saturated with Geon, is being manufactured by Imperial Paper and Color Corp., Glens Falls, N. Y. The paper is easily cleaned with soap and water or with a dry cleaner or bleach for stubborn stains.

Dewey and Almy Chemical Co., Cambridge 40, Mass., has issued a folder on "Darex 43G," a high styrene resin.

Bronco Products Co., 717 Stanford Ave., Los Angeles 21, Calif., has announced a new industrial wheel brochure. Copies available upon request.

Sponges made of polyvinyl chloride plastic by the Sponge Products Division of B. F. Goodrich are replacing natural cork in seine floats now being used by some of the nation's biggest commercial fishing fleets.

Better quality tobacco leaves are being grown today through the use of a pre-growth soil fumigation process which utilizes huge sheets of flexible Geon vinyl plastic. The sheeting is sold by Electro Plastics Fabrics Inc., Pulaski, Va.

Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y., has issued a folder entitled "How You Can Lay a Rubber Tile Floor." Copies are available from the Rubber Flooring Division of RMA.

Aluminized pipe jacketing that is resistant to fire, acid and water has been developed by the Textile Division of U. S. Rubber Co., 1230 Ave. of the Americas, New York 20, N. Y.

Rodney Hunt Machine Co., Orange, Mass., has published its Industrial Roll Engineering Report No. 6 on "Roll Surface Finishes." Copies are available by writing to the company.

Dewey and Almy Chemical Co., Cambridge, Mass., has released a bulletin describing "Darex 43-G in Soft Cellular Soling."

Cratex Manufacturing Co., San Francisco 5, Calif., has developed an inexpensive yet comprehensive Polishing Kit to handle deburring, smoothing and polishing applications. The kit contains an assortment of 24 of the most popular Cratex wheels, cones, blocks and mandrels.

VA-7 Vulcanizing Agent

Thiokol Chemical Corp., Trenton, N. J., has announced the commercial availability of a new moderately-priced vulcanizing agent, designated as "VA-7", which is said to result in an excellent combination of heat aging properties, high tensile strengths and non-blooming characteristics in natural and synthetic rubbers. The company states that because of its moderate price, substantial economies in heat-resistant, non-blooming stocks can be realized with VA-7. The product is a liquid aliphatic polysulfide chemical containing combined sulfur which is available for the vulcanization of unsaturated elastomers. Because of the reactivity of the combined sulfur in VA-7, Thiokol Chemical states, small amounts yield excellent cures and heat aging properties. It is said that elastomers compounded with VA-7 exhibit no bloom in the vulcanized or unvulcanized state. In addition, such compounds display flat curing rates and consistently develop higher tensiles than those obtained with sulfur. Thiokol Chemical states that it is believed that the high tensile strengths can be attributed in part to the ease of dispersion of VA-7 as compared to sulfur. Heat-resistant, non-blooming GR-S stocks are obtained with tetramethyl thiuram monosulfide or benzothiazyl disulfide for acceleration. In high nitrile rubber types, satisfactory cures are obtained with accelerator systems such as benzothiazyl disulfide combined with salicylic acid.

Forms English Subsidiary

National Lead Co., New York, N. Y., has announced the formation of Abbey Chemicals, Ltd., in London, England. The new firm will produce chemicals for industry which have found wide acceptance in the United States and are in increasing demand in England. Production at Abbey Chemicals' plant in Stratford is expected to begin by January 1st of next year. Among the products to be manufactured are stabilizers and plasticizers for vinyl plastics, and gelling agents such as "Bentones." Pigments for the paint industry and other chemicals will also be marketed by Abbey Chemicals. All of these products have been developed in National Lead's laboratories in this country and are being sold in increasing quantities in the domestic market. National Lead's subsidiary, Hoyt Metal Co. of Great Britain, Ltd., owns the majority interest in the new company, with F. W. Berk and Co., British chemical manufacturers, holding the remaining shares. Hoyt Metal now manufactures a line of non-ferrous metal products, such as diesel and other engine bearings, solders and other alloys. Sale of chemical products in continental Europe will be handled through National Lead's subsidiary, Titan Co. A/S.

National Lead Names Woods

National Lead Co., New York, N. Y., has announced the appointment of W. H. Woods as general sales manager of its Titanium Pigment Corp., succeeding K. W. Ericson, who retired after 25 years with the company.

Celebrates 10th Anniversary

E. P. Lambert

E. P. Lambert Co., Akron, Ohio, is now celebrating its tenth anniversary as a dealer in crude rubber and liquid latex. The firm also represents the Neville Co. on the sale of coumarone resins and plasticizers and deals in natural powdered rubber and synthetic rubber. The company was founded on June 16, 1945 by E. P. Lambert who was born in Bloomfield, N. J., in 1901. After serving in the U.S. Navy during World War I, Mr. Lambert started in the crude rubber business in 1919 with the Charles T. Wilson Co. as a clerk and rubber inspector. In 1922, Mr. Lambert began selling on the road and in the same year opened an office in Boston, Mass., for the Wilson company. He returned to New York in 1925 handling crude rubber and liquid latex sales. In 1934, Mr. Lambert was transferred to Akron, Ohio, as manager of the Wilson office in that city. In 1954, some nine years after the formation of the E. P. Lambert Co., arrangements were made with the Superior Mold and Die Co., Stow, Ohio, to act as their agent in the sale of molds to the rubber industry. Present officers of the E. P. Lambert Co., are: E. P. Lambert, president; A. L. MacCracken and D. M. Lambert, vice-presidents, and W. H. Fallon, secretary.

Falls Engineering Expanding

A plant expansion program which will double the production, engineering, and office area of the Falls Engineering and Machine Co., Cuyahoga Falls, Ohio, is now underway. Eighty feet frontage south of the present Falls plant was purchased to make room for the addition. A one-story brick building on this property is already being occupied by the engineering offices of the Campbell Machinery Development Co., which designs "FEMCO" built special machinery for manufacturers of rubber, plastic and similar products. A new addition will house the shipping and receiving departments, paint and carpenter's shop and material storage. Space in the present building which has been occupied by Campbell Machinery has been turned into an additional assembly area for heavy machinery and for shop and office space. When the expansion is completed, Falls Engineering will have four times as much space as it had in 1945.

Bete Named to New Post

Raymond T. Bete, director of quality control at the Goodyear Tire & Rubber Co., Akron, Ohio, has been named development administrator, filling the post left vacant by the late R. T. Brown. C. M. Noble, manager of tire, tube and rim manufacturing operations of the Quality Control Division, succeeds Mr. Bete as director of quality control. Mr. Bete was associated with the Kelly-Springfield Tire Co. before joining Goodyear in March, 1955. He joined Kelly-Springfield in 1926, and held the posts of manager of tire design, technical assistant to the president and development manager. A native of Stoughton, Mass., Mr. Bete holds a degree in mechanical engineering from the Massachusetts Institute of Technology. Mr. Noble was born in Holland, Mich., and was graduated from the University of Michigan at Ann Arbor. He joined Goodyear in 1928 as a staff trainee. He served in tire design and was assigned to the technical service department at Goodyear's plant in New Toronto, Canada, in 1934. Mr. Noble returned to Goodyear, Akron, in 1941, and served in the tire design department until 1953, at which time he joined Goodyear's plant in Los Angeles, Calif., as technical superintendent. He joined the Quality Control Division, Akron, in January, 1955.

Two New Chemigum Latices

Two new small particle size nitrile latices are now being produced by the Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio. The latices, designated as "Chemigum Latex 236" and "246," were designed to upgrade physical properties of products in the paper, textile, leather and pigment fields. Greater coverage and more intimate contact with individual fibers and composition of materials is made possible with the new latices, the company states. A unique combination of small particle size with very high mechanical stability properties are inherent in both latices. Average particle size of the latices is 500 Angstroms, approximately one-fifth the size of normal particle size latices. To determine mechanical stability values, the new products were thoroughly subjected to programmed Case Mechanical Stability Tests where extremely high shear was encountered. Outstanding results in excess of 300 seconds were obtained. Chemigum Latex 236 has a high acrylonitrile content and is recommended for specialty applications where maximum oil resistance and toughness is required. Chemigum Latex 246 is a medium acrylonitrile polymer and can be used economically for more general purpose type applications.

O'Connor Joins Buxbaum

Eugene O'Connor, formerly sales manager of the Special Products Department of the Goodyear Tire & Rubber Co., has been named sales manager of the Household Products Division of the Buxbaum Co., Canton, Ohio. Prior to his seven-year association with Goodyear, Mr. O'Connor was with the Glenn L. Martin Co. of Baltimore, Md., and the Fairfield Engineering Co. of Marion, Ohio.

Plain Bearings Testing Machine

A new bearing testing machine has recently been installed in the laboratory of Farrel-Birmingham Co., Inc., at Ansonia, Conn. This machine is designed for full-scale testing of large plain bearings under conditions simulating as nearly as possible those in actual operation. Tests will be made on bearings commonly used in company products, such as Banbury mixers, rubber and plastics mills and calenders, and rolling mills and sugar mills. Tests will be run on a variety of plain bearing liners such as bronze, babbitt and aluminum. Journals will be of both steel and cast iron. Effect of speed, surface finish, journal temperature, and oil viscosity will be observed.

The machine has a basic journal size of 14-inch diameter. A maximum load on the bearing of 300,000 pounds can be exerted, as produced through an hydraulically actuated lever system with actual force measured by strain gauge. The main framework of the machine is made as a circular ring so that the frame can be rotated to apply load horizontally as shown or from above or below as desired. The driving means for the rotating journal includes a torque meter for measurement of friction torque. Thermocouples are placed in bearing liners to record bearing temperature during operation of tests. Test bearings are lubricated with the several types of lubrication systems that are used in actual commercial operation. Provision is made for heating the test journal to simulate operating conditions encountered in plastic mills and calenders.

ASME Diamond Jubilee Factbook

American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y., has just issued a "Diamond Jubilee Book of Facts." The 80-page publication was issued in connection with the Society's 75th anniversary, being celebrated throughout 1955. It is designed for the use of publications, industrial concerns, advertising agencies, state and local governments, engineering schools, and others wishing to participate in the anniversary celebration. Contents of the book include a short history of the Society; material on the role of mechanical engineers in today's world; a copy of the organization's first catalog. printed in the founding year of 1880; and biographical summaries of persons prominent in ASME history.

Correction

In the June, 1955, issue of RUBBER AGE, there appeared a news item which announced that the Education Committee of the Boston Rubber Group has established a contest for original papers authored by group members. The winning papers will be presented at the technical session of the Spring Meeting in March, 1956. In describing the awards offered for winning papers, there appeared a sentence which read: "Two cash prizes in the amounts of $50.00 and $100 will be awarded for the winning papers." This sentence should have read: Two cash prizes in the amounts of $50.00 and $25.00 will be awarded. We regret the error.

FINANCIAL NEWS

Firestone Tire & Rubber Co.

Six Months to April 30: Net income of $22,330,210, which is equal to $2.76 a common share, an increase of 23% over the net income of $18,129,727, or $2.26 a share, in the same period of the previous year. Sales for the six months ended April 30 amounted to $519,508,494, a record total 16% over sales of $447,949,183 reached in the like period of 1954.

Armstrong Rubber Co.

Six months to April 3: Net income of $797,500, which, after preferred stock dividends, is equal to $1.62 a share, compared with $405,079, or 79c a common share, present share basis, in the same period of the preceding year. Sales in the half year ended April 3, 1955, amounted to $29,851,072, compared with $21,609,506 a year earlier.

Rome Cable Corp.

Year to March 31: Net income of $930,879, which is equal to $1.81 a share, compared with $1,637,787, or $3.27 a share, in the previous year. Sales for the year ended March 31, 1955, amounted to $39,-186,095, compared with $44,114,825 in the preceding year.

Dayton Rubber Co.

Six Months to April 30: Net income of $963,558, which is equal to $1.56 a common share, compared with $327,326, or 48c a common share, in the same period of 1954. Net sales for the period amounted to $30,417,921, compared with $25,002,797 in the 1954 period.

List of American Standards

The American Standards Association, 70 East 45th Street, New York 17, N. Y., has announced the publication of the 1955 edition of "American Standards". The 48-page publication lists and indexes about 1,500 American standards. There are 210 for construction and civil engineering, 153 mechanical, 272 electrical, 158 safety, 165 textiles and wearing apparel, 251 photography and motion pictures, 74 petroleum products, 69 chemical, 62 metallurgy, 38 gas-burning appliances, 32 drawings, letter symbols and abbreviations, 18 mining, 11 rubber, 10 office equipment and supplies, and a miscellany of others. Copies of the publication are available from ASA.

SPI Elects New Officers

At the recent annual meeting of the Society of the Plastics Industry, Inc., Norman Anderson, president of General Molded Products, Inc., was elected president for the 1955-56 season. Alan S. Cole, executive vice-president of Breskin Publications, Inc., was elected vice-president, and William C. Bird, president of Prolon Plastics, Prophy-lac-tic Brush Co., was elected secretary-treasurer.

Division Meeting Plans Set

Preliminary plans for the Fall Meeting of the Division of Rubber Chemistry, A. C. S., in Philadelphia, Penna., have been announced by Dr. B. S. Garvey, Jr. (Sharples), chairman of the Philadelphia Rubber Group's Local Arrangements Committee. The meeting will begin on Wednesday, November 2, and upwards of 1,000 rubber technologists are expected to convene for the three-day session. Headquarters for the meeting will be the Bellevue-Stratford Hotel, where registration will begin on November 1. Technical sessions will begin in the afternoon on November 2, following the 25-Year Club luncheon. The banquet will be held on Thursday evening, November 3. At that time, the Charles Goodyear Medal will be awarded to Dr. R. P. Dinsmore, vice-president of the Goodyear Tire & Rubber Co. Dr. Garvey announced that the historical attractions of the Philadelphia area would be fully utilized in the planning of the ladies' program. Assisting Dr. Garvey on arrangements for the meeting are A. J. DiMaggio (Firestone), vice-chairman, and Dr. M. A. Youker (DuPont), banquet; G. J. Wyrough (Wyrough & Loser), ladies' entertainment; J. S. Sweely (Sun Oil), technical sessions; R. A. Garrett (Armstrong Cork), registration and information; R. J. Salyerds (Harwick Standard), printing; E. J. Strube (DuPont), publicity.

Hewitt-Robins Promotes Hamilton

Robert P. Hamilton has been appointed general sales manager of foam rubber products by Hewitt-Robins, Inc., Stamford, Conn. Mr. Hamilton will be responsible for the sale of all foam rubber products made at the company's plants in Buffalo and Staten Island, N. Y., and Fremont, Ohio. He succeeds Howard D. Herbert, who plans to retire on December 31, 1955. In the meantime, Mr. Herbert will act as an advisor to the sales organization. Before coming to Hewitt-Robins in 1954, Mr. Hamilton was merchandise manager for the Scovill Manufacturing Co., Waterbury, Conn. He also had been eastern regional sales manager for the Stainless Ware Co. of America, Detroit, Mich., and district manager for the Scott Paper Co., Chester, Penna. He is a graduate of Nichols College, Dudley, Mass., and attended the University of Pennsylvania.

Tubeless Tire Mounting Unit

A pneumatic mounting band for quick and simple mounting of tubeless tires has been announced by the U. S. Rubber Co., New York, N. Y. The company states that the unit is so easy in operation that a tubeless tire can be mounted without removing the wheel from the automobile. The tire is placed over the rim, and then the mounting band is placed around the outside of the tire. When the band is inflated, the tire beads are forced into a seal against the rim. The tire is then inflated, and the mounting band is deflated simultaneously by turning the valve cap. The pneumatic unit weighs only five pounds, has no moving parts, and one size fits all passenger car tires.

Four New Goodrich Plasticizers

Four new plasticizers for modifying vinyl resins are now commercially available from the B. F. Goodrich Chemical Co., Cleveland, Ohio. The new "Good-rite" plasticizers include two each of the phthalate and adipate types. The plasticizers are characterized by better permanence due to the lower volatility and a broader range of desirable temperature characteristics, the company states. Lower costs in compounding with vinyl resins can be realized with no sacrifice of quality. The two phthalate type plasticizers, marketed as "GP-265" and "GP-266," have excellent heat and light stability, low temperature flexibility, low water extraction, freedom from color and odor, plus improved permanence qualities. The use of GP-265 provides lower initial viscosity and improved viscosity stability in vinyl plastisol compounds. GP-266 has extremely low volatility and excellent electrical properties, making it advantageous for high temperature wire and cable applications. The new adipate plasticizers, called "GP-235" and "GP-236," are noted especially for their low temperature flexibility and for their low volatility, better permanence, and good electrical qualities. Combinations of the adipate and phthalate type plasticizers in compounding can be developed to fit a broader range of temperature requirements.

Minnesota Mining Promotes Two

Appointment of C. C. March as general manager of the Coated Abrasives and Related Products Division and R. W. Mueller as general manager of the Fibrous and Industrial Tape Division was announced recently by the Minnesota Mining & Manufacturing Co., St. Paul, Minn. As general managers, Messrs. March and Mueller will be responsible for all operations within their respective divisions including research, manufacturing and sales. Since 1948, Mr. March has been manufacturing manager of the Coated Abrasives Division. He joined 3M in 1933 as a laboratory technician following graduation from the University of Minnesota. In 1942, he was named factory manager of the Coated Abrasives Division. Mr. Mueller has been general sales manager of the Coated Abrasives and Related Products Division since 1951. He went to work for 3M shortly after graduation from the University of Minnesota. His first sales assignment came in 1933. By 1949, he had become eastern regional sales manager for coated abrasives.

Hercules Opens New Sales Office

The establishment of a new rubber chemicals sales office at Beaumont, Texas, to serve the synthetic rubber industry in the South and West, has been announced by the Hercules Powder Co., Wilmington, Del. Wilfred E. Osberg, Jr., has been named manager of the new office, which is located at 480-98 Orleans Street, in Beaumont. Hercules products for the synthetic rubber industry include emulsifiers, initiators, and defoamers. The sales territory which the new office will serve includes Texas, Louisiana, and California.

Awarded Honorary Degree

Oliver M. Hayden

Oliver M. Hayden, assistant director of sales, Elastomers Division, E. I. du Pont de Nemours and Co., was awarded the honorary degree of Doctor of Science by Clark University at its 65th commencement exercises. Mr. Hayden, who graduated from Clark in 1914, has long been recognized for his work in performance testing of rubber and in the development and testing of synthetic rubber products, particularly for the automotive industry. In June, 1954, Mr. Hayden was presented an award of merit by the American Society for Testing Materials for his contributions to the society's work on rubber and rubberlike materials and for his four years' service as chairman of Committee D-11. Under his guidance a joint committee of the Society of Automotive Engineers and ASTM wrote specifications and tests for improving the standards for rubber products in automobiles. He has written numerous papers on rubber technology with particular emphasis on application to industry.

He began his professional career in the Production Department of the Fisk Rubber Co., Chicopee Falls, in 1919 and progressed through all manufacturing departments to control and research laboratories. At the time he joined DuPont in 1926, he was responsible for rubber compounding at the Fisk plant at Chicopee Falls and at a subsidiary plant, Federal Rubber Co., Cudahy, Wisc. Mr. Hayden began at DuPont as a compounder in the rubber laboratory section of the Technical Laboratory, Deepwater Point, N. J., and was promoted to supervisor in 1927. In 1929 he was made manager. He was transferred to Wilmington, Del., in 1941 as assistant manager of the Rubber Chemicals Division (now Elastomers Division) and in 1949 became manager of the division's technical section. In 1954 he was appointed assistant director of sales for the Rubber Chemicals Division (now Elastomers Division). He served with the Office of Price Stabilization from July, 1952, to January, 1953.

Specification sheets on "Darex 43G" and "Darex DBM" are available from Dewey & Almy Chemical Co., Cambridge, Mass. Request Bulletins C-15 and W-16, respectively.

Personnel Changes at Cyanamid

Six changes in the Technical Department of the Organic Chemicals Division, American Cyanamid Co., New York, N. Y., were recently announced. Dr. W. A. Raimond has been appointed assistant technical director for the division. He formerly served as technical director for dyes and related products. Dr. A. G. Hill, technical director for the Intermediate and Rubber Chemicals Department, has been appointed resident technical director for the division's plant at Bound Brook, N. J. Dr. Hill has responsibility for the administration of the Technical Department at Bound Brook and, in addition, will act as development manager for the intermediates produced by the division. Dr. R. C. Conn has been appointed development manager for dyes and textile resins, and Dr. E. H. Ebel has been named development manager for rubber chemicals. Dr. W. P. Munro has been named development manager for vat dyes and vat dye intermediates, and W. E. Sisco has been appointed development manager for coal tar chemicals. Dr. Ebel joined Cyanamid in 1941, and prior to his present appointment served as chief chemist.

Oakite Forms Export Division

Oakite Products, Inc., New York, N. Y., manufacturers of specialized industrial cleaning and related materials, has announced the formation of an Export Division to handle the increasing demand from Latin American and overseas companies. Harry V. Kerker, with Oakite since 1943, has been appointed manager of the new division. In announcing the formation of the new division, John A. Carter, president of Oakite, cited the growth of the company since 1909 under the impetus of American technology, so that the company now manufactures more than 115 different materials, has more than 225 representatives, and serves more than 35,000 customers in the United States and Canada. "This American technology," Mr. Carter stated, "has now spread around the world and has created a great demand for specialized production and maintenance cleaning materials in manufacturing centers in Latin America and overseas."

Tubeless Tire Repair Unit

Tom Mullen of Evansville, Ind., has set up a new corporation, T-M Products, to market a new tubeless tire repair unit which he recently patented. After watching tire repairmen painstakingly remove the sealed-in tires from their rims to repair bad breaks, Mr. Mullen got his idea from and old time bicycle tire repair kit. In the kit was a needle that was used to poke in rubber bands which had been soaked in a gummy substance. This material hardened in the bicycle tire. Mr. Mullen's unit, about the size of a fountain pen, uses small flat fibers, rolled into cords and impregnated with a special formula gummy solution. The needle, threaded with the fibers, twists the fibers into holes as big as lead pencils until the fibers knit securely inside the tire wall. Jewett A. Davidson, an Evansville tire dealer, has been named president of T-M Products.

Canadian News

According to trade reports, Canada's tire makers are caught in a tight synthetic rubber squeeze, and there is no sign of the pressure easing. Although Canada's big Crown-owned synthetic rubber producer—Polymer Corp. at Sarnia, Ontario—is boosting production by another 7,000 tons this year, it hasn't been able to keep up with the recent big surge in domestic business. As a result, all domestic customers have been put on allocation.

The situation is a product of two developments: (1) the rising trend in natural rubber prices which got under way last fall, and (2) the current unprecedented demand for tires from the automobile manufacturers.

It is said that if Polymer officials had received enough advance warning of the big boom coming in home business, they would not have gone out and contracted to sell a good percentage of this year's production in the export field. But the tire people themselves erred on the low side in forecasting to Polymer that their 1955 requirements would be roughly in line with last year. They are running at least 20% higher at the moment.

When the price of natural rubber climbed steadily through the latter part of 1954 and reached a peak of 38c a pound (No. 1 Ribbed Smoked Sheets) in February of this year, tire makers had already started increasing their synthetic orders. The higher the price rose, the greater competitive advantage in shifting more rubber requirements to the steady, lower-priced synthetic. Then, on top of this, the orders started rolling in from the auto makers and the tire people stepped up their purchasing activities.

By this time, there was nothing Polymer could do but swing about 1,000,000 pounds or so of non-firm export business back to the domestic market and to exert every effort to increase production.

Some manufacturers of mechanical rubber goods and specialties are said to be even harder hit than the tire makers. Many manufacturers of mechanical goods operated almost wholly on synthetic rubber. To obtain increased supplies they are forced to switch entirely to higher-priced natural and cope with the headaches of radically changed formulations.

Some of the big tire makers are insisting something must be done to assure that such a supply squeeze never develops again. They argue that since Polymer is a public company and a virtual monopoly, its first responsibility should be to domestic industry and there should always be some extra capacity and/or stockpile available for just such an emergency.

Polymer officials counter: Domestic industry has always had the first chance at production. Surely no one expects Polymer to change its sales pattern from export to domestic by more than 20% on a few days' notice. As Polymer's capacity is running more than double average domestic market requirements, export business is very important to the company. Polymer does not intend to cut these long-established foreign customers off with a few days' notice when a sudden rush of domestic business floods in, officials stated.

Exploratory talks have been held between Polymer officials and big rubber consumers on leveling out wide fluctuations in domestic demand. Polymer, which is currently doubling warehouse capacity, has offered to stockpile some production each year against emergency situations if some form of purchase guarantee can be provided by the big consumers. So far, the big tire people have shied away from any kind of purchase guarantee.

A new angle during the last few weeks could, in time, considerably alter the supply situation. A few Toronto rubber brokers, representing recently formed synthetic divisions of long-established U. S. companies, have offered limited July and August deliveries of GR-S-type rubber to Canadian tire makers. Prices are believed to be in line with Polymer prices plus the 5% tariff prevailing on imports of U. S. synthetic rubber grades.

Up to now Polymer has virtually had the whole Canadian market to itself. As long as they were in government hands, the U. S. wartime rubber plants operated considerably below capacity and did not go in for exports. But late in April most of these plants were sold to private industry.

Already a strong competitive marketing race is lining up. Polymer officials are fully alive to the situation and look for sharply increased competition in the whole rubber marketing field.

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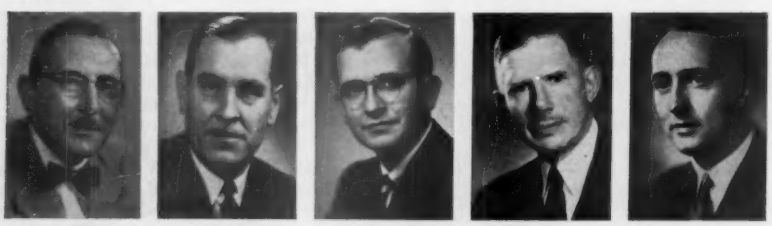
Dunlop Canada, Ltd., Toronto, Ont., Canada, has announced several new executive appointments including four vice-presidents and a secretary-treasurer. H. S. Pritchard, formerly general sales manager, has been named vice-president of the Industrial and General Products Division. Mr. Pritchard will also be responsible for "Pillofoam." W. R. Walton, Jr., a director of the company and formerly assistant general manager, has been appointed a vice-president. G. F. Plummer, also a director and previously assistant general manager, has been appointed vice-president in charge of the Automotive Division. W. H. Bartlett, formerly general works manager, has been named vice-president in charge of manufacturing. The new secretary-treasurer of the company is J. R. Swann. J. P. Anderson, president of Dunlop Canada, stated that the appointments are in line with the continuing expansion and divisionalization policy of the company.



H. Pritchard | W. Walton | G. Plummer | W. Bartlett | J. Swann

Newly-elected officers of Dunlop Canada, Ltd.

—

Total new rubber consumption in Canada in 1955 will likely rise considerably above the 1954 level, according to officials of the Rubber Association of Canada. Both retiring president R. C. Berkinshaw and general manager Greig B. Smith told the association's recent meeting that budget concessions should encourage sales of auto tires and tubes in Canada. Here are 1954 facts on the rubber industry in Canada reported to the meeting:

Canadian consumption of new rubber was the second highest on record, although off slightly from 1953. The drop was centered on synthetic rubber which dropped from 35,910 tons in 1953 to 30,071 tons last year. Consumption of natural rubber, including latex, rose from 37,482 tons in 1953 to 41,574 tons.

Sales of tire casings were off some 3½% in 1954 from the previous year. This has been attributed to a slump in sales in motor vehicle and agricultural implement industries, aggravated by prolonged strikes in both.

Total exports of Canadian rubber products rose moderately at $11,136,000 ($8,334,000 in 1953). This rising trend has been continued in the first quarter of 1955.

The rising trend in imports of rubber products which has been in evidence for some years was halted in 1954. Total value amounted to $21,738,000 ($24,433,000).

Mr. Berkinshaw stated that imports of rubber-soled canvas footwear in the first quarter of this year were at an even higher rate than in 1954. Consumption last year, for instance, amounted to 3,000,000 pairs and a third of this was supplied by imports.

"The market lost by Canadian products to the imports represented 450,000 man-hours of work by Canadian footwear factories and, in addition, our economy sustained a further loss in purchases of $480,000 worth of Canadian materials, such as textiles, chemicals, etc.," Mr. Berkinshaw stated.

One reason, he said, that they welcomed elimination of the excise tax on tires and tubes was because they could pass on to the consumer the tax saving—approximately 8% of the suggested retail price—and provide clear evidence of the extraordinary effect of the Canadian tax burden on such products.

Comparisons between the prices in Canada and the U. S. were constantly being made by the consumer. Because of high

sales tax—and, until recently, heavy excise taxes—such comparisons have in the past been decidedly unfavorable in Canada.

Dealing with the replacement field, Mr. Smith said: "Sales of farm tires were also substantially lower in 1954 because of lower farm incomes, while truck tire sales failed to rise above the disappointing 1953 figure because of a general decline in freight movements and the increasingly severe competition given the trucking industry by the railways."

Robinson Collo Canada, Ltd., a joint enterprise of Robinson Cotton Mills, Ltd. and the American Collo Corp., will soon manufacture "Collo Allfoam" at Woodbridge, Ont. Robinson Collo Canada, Ltd., will operate under a license granted by the Mobay Chemical Co. of St. Louis, Mo., a joint enterprise of Monsanto Chemical Co. and Bayer-Leverkusen (formerly I. G. Farben).

It is anticipated that the Woodbridge plant will be in full operation by the end of September, 1955, and that it will then be in a position to supply polyurethane foam in a variety of densities, pore structures and in various colors in blocks, sheets and special shapes prepared for a large variety of specific applications in industry.

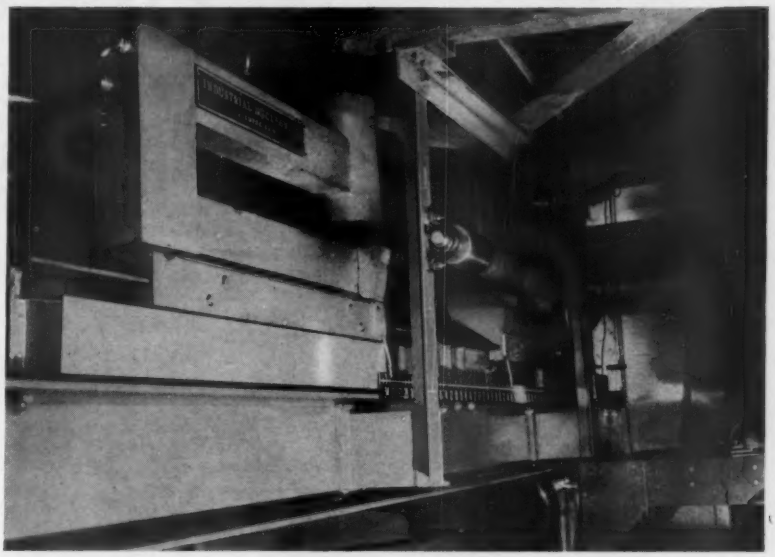
A. Clifford Barrett, who has been connected with the advertising business in Canada and England for a number of years, has joined Dominion Rubber Co., Ltd. Mr. Barrett will be in charge of all advertising of the company's Tire Division. He will spend a period in the advertising department at the company's general offices in Montreal, after which he will transfer to the tire sales head office in Kitchener, Ontario.

William H. Funston, president of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., recently celebrated his completion of thirty years' service with the company. Mr. Funston has been president of the company for the past twenty-three years. At this year's annual meeting of the Rubber Association of Canada, Mr. Funston was elected president for 1955-56. For the past two years, he has been vice-president of the Association, and served a previous term as president of the organization back in 1937.

Collapsible Storage Tanks

Huge collapsible storage tanks for storing bulk liquids as an emergency or temporary measure are now in production for commercial use by the Aviation Products Division of the Goodyear Tire & Rubber Co., Akron, Ohio. It was pointed out that the pillow-type tanks, originally developed for military use, are constructed of two layers of fabric-reinforced synthetic rubber, vulcanized into a single unit. The inner layer of the fabric consists of a gasoline barrier imbedded between two layers of gasoline-resistant synthetic rubber. The portable tanks are manufactured in 900, 3,000 and 10,000 gallon sizes, with larger and intermediate sizes available on special order. The tanks can be used on remote construction projects for gasoline or fuel oil storage to meet emergency conditions.

AUTOMATIC CONTROL OF 4-ROLL INVERTED L CALENDER ANNOUNCED



The measuring unit of the system is shown above measuring a sheet of tire fabric. A like unit is located directly across the sheet.

What is believed to be the first automatic control of a 4-roll, inverted L calender has been announced by Mansfield Tire & Rubber Co., Mansfield, Ohio. Tradenamed "AccuRay," the control system automatically adjusts the bottom and offset rolls of the calender which simultaneously lay a top and bottom coating of rubber on tire fabric. Control action is based on weight readings of the fabric provided by the "eyes" of the system, two measuring units which use invisible rays from radioisotopes to monitor each inch of production. Whenever the coating weight varies from specification, the measuring units signal the automatic controller, which, in turn, adjusts the coating rolls.

Each of the two nuclear units, located across sheet from each other, works with its own automatic controller. The unit on the left side of the sheet controls the left side of the calender rolls while the right unit adjusts the right side of the rolls. In addition to signalling the controllers, the nuclear units record the exact weight of the fabric on a continuous strip chart. This provides operators with a picture of the process at all times and shows clearly the effect of control actions. Control action is proportional — the larger the error, the longer the correction time. The system operates continuously, but control action takes place only when necessary, Mansfield Tire and Rubber states.

Safety devices are incorporated in the system to insure product and process protection. Should equipment failures occur, or should unusual process conditions prevent the controller from making its proper corrections, automatic control ends and an alarm sound to inform the operator of the situation. The new control system is manufactured by Industrial Nucleonics Corp. of Columbus, Ohio.

Frederick Marchionna Retires

Frederick Marchionna, whose name has been synonymous with rubber and plastics activities in the U. S. Patent Office for the past thirty years, has retired from government service. Widely known as the author of "Latex and Its Industrial Applications" and "Butalastic Polymers," Mr. Marchionna has spent his entire government career with the Patent Office. An engineer by profession, he also studied law while in government service and is authorized to appear in Federal courts. Mr. Marchionna sailed on June 17 on the *S.S. Vulcania* with his family for a six-month tour of Europe, including a stay in his native Italy. On his return, he is planning to establish himself as a consultant on natural and synthetic rubbers, where his patent experience will serve him in good stead. Mr. Marchionna makes his residence at 4816 Forty-Seventh St. N.W., Washington 16, D. C.

Sharples Thiophene Available

"Thiophene" is now available in commercial quantities, according to Sharples Chemicals Inc., a subsidiary of the Pennsylvania Salt Manufacturing Co., Philadelphia, Penna. Thiophene is expected soon to be widely used in rubber, plastics, resins, agricultural and photographic chemicals. Thiophene, a highly versatile heterocyclic sulfur compound, has a number of interesting properties. In reactivity it is similar in many respects to phenol, benzene and certain unsaturated hydrocarbons. Thiophene is readily nitrated, halogenated, alkylated, metalated, acylated, aminated, and undergoes condensations with formaldehyde and maleic anhydride. Commercial production of Thiophene was brought on stream recently in the new plant facilities operated by Index Chemical Co., Houston, Texas, a subsidiary acquired by Pennsalt in January, 1955.

Gillette Tubeless Nylon Tire

An extra-quality tubeless nylon tire with a special tread to give 30% more skid protection than standard tires has been announced by the Gillette Tire Division of the U. S. Rubber Co., New York, N. Y. This is the first premium tire ever made by Gillette, which began making automobile tires nearly 40 years ago. The "Gillette Premium" has a special groove pattern that helps minimize both forward and lateral skids. When brakes are applied, or with quick acceleration, the tread opens up slightly so that hundreds of extra traction edges reduce wheel slippage. In ordinary driving, the tread is closed, giving smooth and quiet operation. Mileage in the new tire is reported to be as much as 35% greater than with standard tires. Part of this is the result of the special tread compound with a fine-grain carbon black reinforcing agent. In proving ground tests, the new tire was driven at sustained high speeds, and over rough country roads without a blowout despite the fact that wheels were damaged in some of the tests. The tire tends to seal around any puncturing object such as a nail, eliminating rapid loss of air. The tire is available in four sizes from 6.70 to 8.00 on 15-inch wheels in white sidewall models.

Blue Streak Racing Type Tire

A new road-proved, racing type tire of unusual stamina, designed to meet the trend toward higher horsepowers, especially in current sports model cars, is now being produced by the Goodyear Tire & Rubber Co., Akron, Ohio. Built with all-nylon, triple-tempered cord and manufactured in both tubeless and tubed versions, the tire is called the "Blue Streak." The new tire is designed for cars with extremely high horsepower and speed ratings. Since such cars are powered for faster pickup as well as extremely high speeds, they subject tires to exceptionally hard use. To meet the rigorous tests imposed by this type of operation, the new tire incorporates all the characteristics of the company's road racing tires—proved by their outstanding performance in the four Pan American road races to date. One of the features of the new tire is the lower cord angle of its plies—resulting in a flatter, road hugging tread surface at high speeds, thus helping to prevent tire distortion, Goodyear states. The tire is currently produced in the 8.00-15 size only, with reversible white sidewall, but additional sizes will be added as needed, the company said.

Bakelite Co., New York, N. Y., has instituted a new mechanical handling system utilizing large, collapsible containers constructed of synthetic rubber and fabric —like auto tires—for bulk shipments of polyethylene. The containers are made by U. S. Rubber.

Completely root-proof, watertight, clay sewer pipe lines are now possible with new Koroseal molding compounds that permanently seal joints between lengths of pipe. The compounds are made by the Goodrich Industrial Products Division.

Free-Flowing Stabilized Rosin

A free-flowing form of stabilized rosin, promising greater ease of handling, has resulted from research performed at Battelle Memorial Institute, Columbus, Ohio. This rosin composition remains free-flowing because it has been pelletized and treated with a special conditioner. Various forms of rosin are used in rubber compounding, varnishes, paper sizing, and many kinds of pressure-sensitive adhesive tapes. At present it is shipped in steel drums as a solidified mass which is chopped into small pieces for use. The new free-flowing form can be shipped in paper bags or fiber drums, as well as steel drums, and can be poured from the container. The pellets will not fuse at temperatures up to 130°F.; neither will they cake under pressure when bags of the material are stacked for storage. The composition, based on an iodine-disproportionated rosin, is also stabilized against deterioration through oxidation. Known as "Galex Pellets," the new form of modified, free-flowing rosin will be produced by the G and A Laboratories, Inc., Savannah, Georgia, who sponsored the research at Battelle. Sole sales distributors will be National Rosin Oil Products, Inc., New York City.

Watson-Standard 12-837 Adhesive

Watson-Standard Co., Pittsburgh, Penna., has announced the development of a new adhesive specifically made for the adhesion of plastisol to metal. The company explains that since plastisols are frequently used as decorative or functional coatings on metal, it is necessary to use an adhesive in conjunction with the plastisol compound. Watson-Standard "12-837" not only is an agent for good bonding, but it is also highly chemical resistant and will prevent subsurface film corrosion. The adhesive must be cured or baked at 380 to 400°F. for ten minutes to obtain ultimate adhesion, the company states. When properly applied, it will provide adhesion of 18 to 24 pounds per linear inch. It is necessary that the metallic surface be free from oil, grease and dirt.

"and he's the chief tester of our rubber pants division!"

PX-120 Phthalate Plasticizer

The Plasticizer Division of the Pittsburgh Coke & Chemical Co., Pittsburgh, Penna., has added Pittsburgh "PX-120" (diisodecyl phthalate) to its broad family of phthalate plasticizers. Pittsburgh PX-120 provides compounders with a unique combination of properties, including very low volatility, good permanence, low temperature flexibility and the economy that results from its low specific gravity, the company states. It is particularly suitable for high temperature processing cycles. Vinyl products containing Pittsburgh PX-120 exhibit long life, a high degree of resistance to extraction by various materials, and low temperature properties comparable to those provided by DOP. Plastisols prepared with Pittsburgh PX-120 are characterized by superior viscosity stability. These properties make Pittsburgh PX-120 ideal for such applications as sheeting, flooring, coated fabrics, vinyl sponge and extruded items such as refrigerator gaskets, shoe welting and electrical packeting, Pittsburgh Coke declares.

Class 700 Silicone Rubber

Development of a new type of silicone rubber, capable of remaining flexible at 600°F., has been announced by the Silicone Products Department of the General Electric Co., Waterford, N. Y. Designated "Class 700," the new materials have been designed to extend the application range of silicone rubber to 600°F. Although far superior to organic rubbers in high temperature resistance, the company states, silicone rubber has been hitherto limited to a maximum usable range of about 500°F. The new materials are capable of remaining flexible for 150 hours or longer during continuous exposure up to the peak of the new temperature range, according to company engineers. Previously available types of silicone rubber became brittle in less than 24 hours exposure to this test. The improved high temperature resistance of the Class 700 materials has been obtained without sacrifice of other silicone rubber properties — such as ozone, aging and weathering resistance, low temperature flexibility and low moisture absorption.

Steel Pre-Fab Warehouse

Development of a new "straight-wall" pre-fabricated steel building, featuring inexpensive, trussless construction, and specifically designed to meet storage and warehousing needs of rubber processors, has been announced by the Engineering and Research Division of the Wonder Building Corp. of America, Chicago, Ill. The new "straight-wall" building can be erected in a matter of hours by as few as two workers using simple nut and bolt fasteners, the company states. Erection costs are said to average 30c per square foot. Purchase costs are $1.25 per square foot, for a building complete with ends, doors, and all necessary hardware. Wonder buildings require no foundation other than a simple concrete slab. The new structure is designed to meet all building code requirements, and will withstand wind velocities up to 125 miles per hour.

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Los Angeles News

Joe Larkin, formerly chief chemist of the PB Division of the Byron Jackson Co., has joined the Shell Chemical Co. Mr. Larkin is presently associated with the company's laboratories at Emeryville, Calif., for a four-month training period, after which he will be assigned to duties at the Torrance, Calif., synthetic rubber plant. Henry Murata has succeeded Mr. Larkin as chief chemist at the PB Division.

William Deis, formerly associated with the Goodyear Rubber Co. of San Francisco, Calif., has been appointed research laboratory technician at the Marine Magnesium Division of Merck & Co., Inc., South San Francisco.

Jack Kertson, long associated with the chemical sales field in southern California, has left the B. E. Dougherty Co., Los Angeles, to open an office in Tucson, Arizona, for the Ratliff Rubber Co.

William A. Fairclough, formerly representative for the Naugatuck Chemical Division, U. S. Rubber Co., in southern California, has been named assistant sales manager of the division with headquarters in Naugatuck, Conn. He will assume his new post in September. C. M. Churchill, formerly chief chemist for the Kirkhill Rubber Co., has succeeded Mr. Fairclough with Naugatuck Chemical.

David Adams, owner of the Adams Rubber Co., has dissolved his firm and has joined the Stoner Rubber Co. of Anaheim, Calif.

Curtis Wolter has left the Sales Division of the Pacific Moulded Products Co. and has joined the Master Processing Corp. of Lynwood, Calif.

H. Findlay, formerly associated with the Shell Oil Co., has been transferred to the Sales Division of the Shell Chemical Co. at Torrance, Calif. Dick Way has been assigned to succeed Mr. Findlay in the Sales Division of Shell Oil.

R. W. Maney, formerly assistant general manager and plant manager at the Los Angeles plant of the Goodyear Tire & Rubber Co., has been named general manager. R. V. Thomas, formerly assistant plant manager, has been named plant manager. Mr. Maney has been associated with Goodyear since 1929, while Mr. Thomas has been with the company since 1943.

Cuts Vinyl Resin Prices

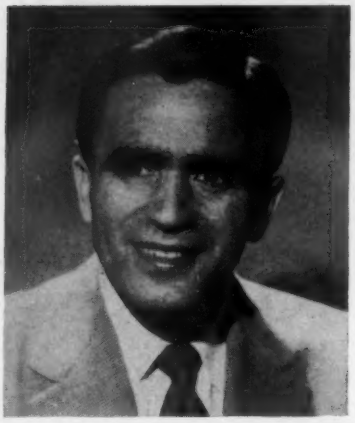
Bakelite Co., New York, N. Y., has announced vinyl resin price reductions ranging from 9 to 18%. The greatest drop, from 38 to 31c a pound, will be in the company's non-solvent type, a 97-98% vinyl chloride copolymer of vinyl chloride-vinyl acetate, and certain of its 100% vinyl chloride polymers. Solvent resin types, of which the company's "VYHH" is typical, have been reduced by 1 to 3c a pound. Emulsion polymerized vinyl chloride resins have been reduced by 6 to 7c per pound. The price reductions became effective on June 27. C. W. Blount, vice-president in charge of sales for Bakelite, stated that the reductions were considered an important step toward expanding the market for vinyls. He also stated that imported vinyl resins have increased in volume some 600% over the past year or so, and sell at a price several cents per pound lower than domestically produced polyvinyl chloride. "Bakelite's reduced prices will give it a better chance to compete with foreign-made material," Mr. Blount said. The Bakelite move is expected to be matched by other companies in the field. The industry, for some months, has been burdened by over-production and increasing foreign competition, trade sources point out. It is estimated that imported resins now account for about 10% of the vinyl market in this country. Spokesmen for two other major vinyl producers, Goodrich Chemical and Naugatuck Chemical, have stated that their concerns intend to "remain competitive" concerning prices of vinyl resins.

Dry Color Trust Charged

A Federal Grand Jury, meeting in New York City, has returned an indictment against six companies charging restraint of trade in the manufacture and sale of dry colors. The indictment charged that the six companies had engaged in an unlawful combination and conspiracy to restrain competition in the sale of dry colors by agreeing to fix and maintain prices, terms and other conditions of sale. The companies named as defendants are: Standard Ultramarine and Color Co., Huntington, West Va., American Cyanamid Co., New York, N. Y., Imperial Paper and Color Corp., Glens Falls, N. Y., Sterling Drug, Inc., New York, N. Y., Holland Color and Chemical Co., Holland, Mich., and the Sherwin-Williams Co., Cleveland, Ohio. The six companies, it was estimated, account for $30,000,000 annually of the business in the dry color field which is estimated to total about $80,000,000 yearly. Damage to the consumer companies by the alleged price fixing was set unofficially at $1,000,000 a year for the nine years embraced by the investigation. The inquiry on which the indictments were based has been in progress since February. The anti-trust indictments are said to have been the first returned in this industry.

Bakelite Co., New York, N. Y., predicts that polyethylene output in the next five years will approximate 627,000,000 pounds a year, tripling present production, and offering many potential markets for the plastic film.

Serpico Joins Marbon Chemical



John D. Serpico

D. M. Pratt, vice-president and sales manager of Marbon Chemical, Division of Borg-Warner, has announced the appointment of John D. Serpico as assistant manager of technical service. Mr. Serpico's background includes experience with Rodic Chemical & Rubber Corp. as development manager; with the Economy Faucet Co. as plant manager, and with Allis Rubber Co. as chemist. In addition, Mr. Serpico has had compounding experience in Army and Navy specifications, automotive, O-rings, seals, aircraft specialties, printing rolls, platens, rubber novelties and toys, manufacturing plant specifications, vinyl flooring and tiling, plus all types of rubber-to-metal bondings. Marbon Chemical manufactures synthetic resins for the rubber and paint industries, high impact thermoplastics for the plastics industry and adhesives for bonding rubber to metal.

Carbowax 20M Available

"Carbowax" polyethylene glycol "20M" is now commercially available in easy-to-use pellet form according to an announcement by the Carbide and Carbon Chemicals Co., New York, N. Y. The pellets are white and have a maximum diameter of ½ inch. They flow freely from the shipping containers (75 pound multi-wall bags) and dissolve readily in water in concentrations up to 50%, the company states. Carbowax 20M is the newest member of Carbide's series of polyethylene glycols. Its molecular weight is approximately 20,000, the highest of the series, and it has the binding, suspending, and lubricating properties typical of these compounds. Both the melt and solution viscosities of Carbowax 20M are higher than those of other members of the series and films formed from it are stronger and harder. Carbowax polyethylene glycol 20M is suggested for use in colored pigment suspensions, aqueous-based inks, and other preparations where mild thickening action combined with suspending power is desired. It shows promise as a release agent for rubber where intricate molds require a viscous lubricant, as a water-soluble binder in paper and textile starch sizes, and as a binder for ceramics, carbon products, and synthetic detergent cakes.

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- Heater Hose
- Body Insulators
- Heater Can Anti-Squeak Pad
- Steering Post Bracket Insulator
- Spark Plug Covers
- Steering Post Pads
- Radiator Drain Tube
- Silent Block Bushing
- Tail Pipe Insulator Support
- Wiper Hose
- Antenna Gaskets
- Division Channel Weatherstrip
- Window Channel Filler Seal
- Parking Light Lens Gaskets
- Bumper to Fender Spacer
- Fresh Air Adapter Grommets
- Battery Drain Tubes
- Gearshift Lever Arm Bushing
- Replacement Tubes
- Frame & Axle Bumpers
- Spring Shackle Bushings
- Fender & Engine Compartment Dust Shield
- Steering Wheel Spoke Ornament Cushion
- Instrument Panel Anti-Squeaks, Wiring Grommets
- Windshield Wiper Pivot Pad & Bracket Grommet
- Rear Window Weatherstrips
- Horn Ring Ornament Cushion
- Dash Liner & Cowl Trim Pads
- Door Check Arm Bumpers
- Stone Deflector Bumper
- Sound Deadener Insulation
- Tubeless Tires
- Wiring Clips
- Body Shims
- Headlight Lens Gaskets
- Radiator to Hood Seals
- Tail & Stop Lamp Lens Pads
- Radiator Seals
- Hood Lacing
- Fender Seals
- Hood Bumpers
- Bumper Grommet
- Glove Box Door Bumpers
- Gas Tank Filler Neck Grommet
- Sill Mats & Attaching Grommets
- Defroster Hose
- Door Bumpers

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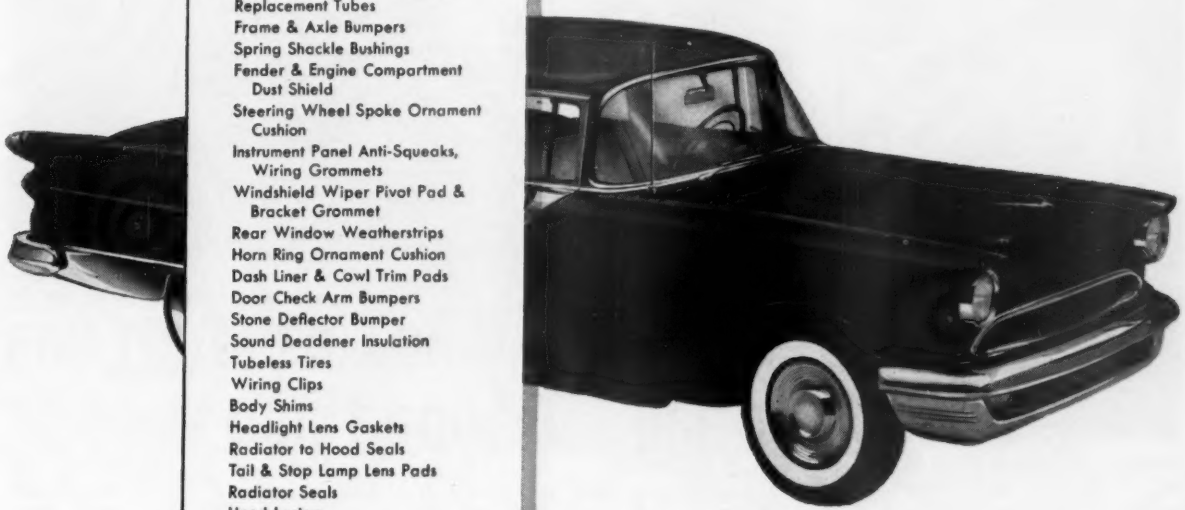

It's good news for car owners that the rubber parts that used to crack, chip, and practically disintegrate under tough road and weather conditions are being replaced with parts made from super-durable Enjay Butyl. In over 100 vital places, Enjay Butyl helps give many '55 models the performance and appearance that make them a pleasure to drive, an economical unit to maintain.

If you make a product in which rubber is used, or *could* be used, you owe it to efficient business practice to investigate the many advantages that Enjay Butyl has over other types of rubber. Its price is a definite advantage, too. Complete laboratory and technical facilities are at your service. For full information contact the Enjay Company today.

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Obituaries

Robert L. Cragan

Robert L. Cragan, superintendent of the Lloyd Manufacturing Co., Apponaug, R. I., died suddenly of a heart attack on June 4. He was 44 years old. Born in Providence, R. I., Mr. Cragan's early years were spent in Stonington, Conn. He later attended the University of Rhode Island, where he was outstanding in football, baseball and basket ball. After graduation in 1933, Mr. Cragan played professional football with the Providence Steamrollers. His first association with the rubber industry was as foreman of the wash line at Carr Manu-

facturing Co., Bristol, R. I., in 1936. In 1940, he became superintendent. After leaving Carr, he was superintendent of the Thread Department of the Firestone Tire & Rubber Co. in Fall River, Mass. Mr. Cragan had been superintendent of Lloyd Manufacturing for the past ten years. On the day of his funeral, the company closed down the plant in his memory. A resident of East Greenwich, R. I., Mr. Cragan was very active in local affairs. In 1952, he was elected a member of the Town Council and he was the organizer and founder of the East Greenwich Little League. He was vice-president of the University of Rhode Island Century Club and was sole nominee for the office of alumni member of the University's Athletic Council. He was also on the board of directors of the Providence Gridiron Club and was a member of the East Greenwich Holy Name Society, Lady of Mercy Church, Knights of Columbus and the Rhode Island Rubber Group. His wife and three children survive.

Edmundo J. Phelan

Edmundo J. Phelan, vice-president of Compania Hulera-Euskadi S. A., an associate of the International B. F. Goodrich Co., died in an automobile accident on June 4 in Mexico City. In his capacity as an official of the Mexican firm, which manufactures Goodrich-Euskadi tires, tubes and accessories, Mr. Phelan had visited the United States many times.

William M. Mettler

William M. Mettler, assistant secretary of the Goodyear Tire & Rubber Co., died suddenly at his home in Akron, Ohio, on June 7. He was 63 years old. Mr. Mettler had been associated with Goodyear since 1916 when he joined the firm's credit department. A short time later he was assigned to the compounding department as chemist and compounder. In 1920, he was appointed secretary-treasurer of the Goodyear Relief Association and later that year became assistant to the secretary of the company. He held this position until 1926 when he became assistant secretary. Born in Kalispell, Montana, Mr. Mettler attended the University of Montana and Yale University. He graduated from the latter institution in 1915 and subsequently received his law degree from Cleveland Law School. Prior to joining Goodyear, he was sales manager for Rand Systems Corp. Mr. Mettler was a member of Sigma Chi fraternity, Executives Club and a member of the board of trustees of the Akron, Ohio, YMCA, as well as of the Family Service Society and the United Community Chest of Akron, Inc. He was on the executive committee of the Bath Grange and a member of the Pomona Grange of Summit County, Ohio. Surviving are his wife, four daughters and two sons.

Thomas J. Seward

Thomas Joseph Seward, inventor of processes for insulating electrical wire, died on June 7 in Easton, Penna. He was 73 years old. In 1904, Mr. Seward developed a process for covering wire with rubber. Later, while affiliated with the Electrical Cable Co. of Bridgeport, Conn., he invented other devices used in the manufacture of electrical apparatus. In 1922, Mr. Seward formed the Seward Wire Co. in Parkersburg, West Va. When the company failed in 1936, he did consulting work in New Jersey until 1941. Later, he and his son were associated in a distributing business in Easton, Penna., until 1950, when Mr. Seward became affiliated with the Magnetic Windings Division of the Essex Wire Corp. He retired in January, 1955. He was a former president of the Manufacturers' Association of Connecticut and had been a director of the National Association of Manufacturers. Surviving are his wife, a son and a daughter.

Burkard S. Killian

Burkard S. Killian, retired manager of the Killian Manufacturing Co., died on June 5 at his home in Akron, Ohio. He was 70 years old. Born in Millersburg, Ohio, Mr. Killian was a farmer and served with the B. F. Goodrich Co. before joining the Killian company in 1927. He retired in 1951. Mr. Killian was a member of the Holy Name Society and the Knights of Columbus. He is survived by his wife, two sons and two daughters.

Philip E. Young

Philip E. Young, president and founder of the Acushnet Process Co., New Bedford, Mass., died on June 17. A graduate of Massachusetts Institute of Technology with a B.S. degree in mechanical engineering, Mr. Young had been in the rubber business since 1909. In 1910, he organized

and founded Acushnet Process. He was also the inventor of the Young Gravitometer. Mr. Young held memberships in the New Bedford Country Club, Wamsutta Club of New Bedford and the Riviera Club of Coral Gables, Fla. Surviving are his wife, a daughter and a son.

F. O. Holbrook

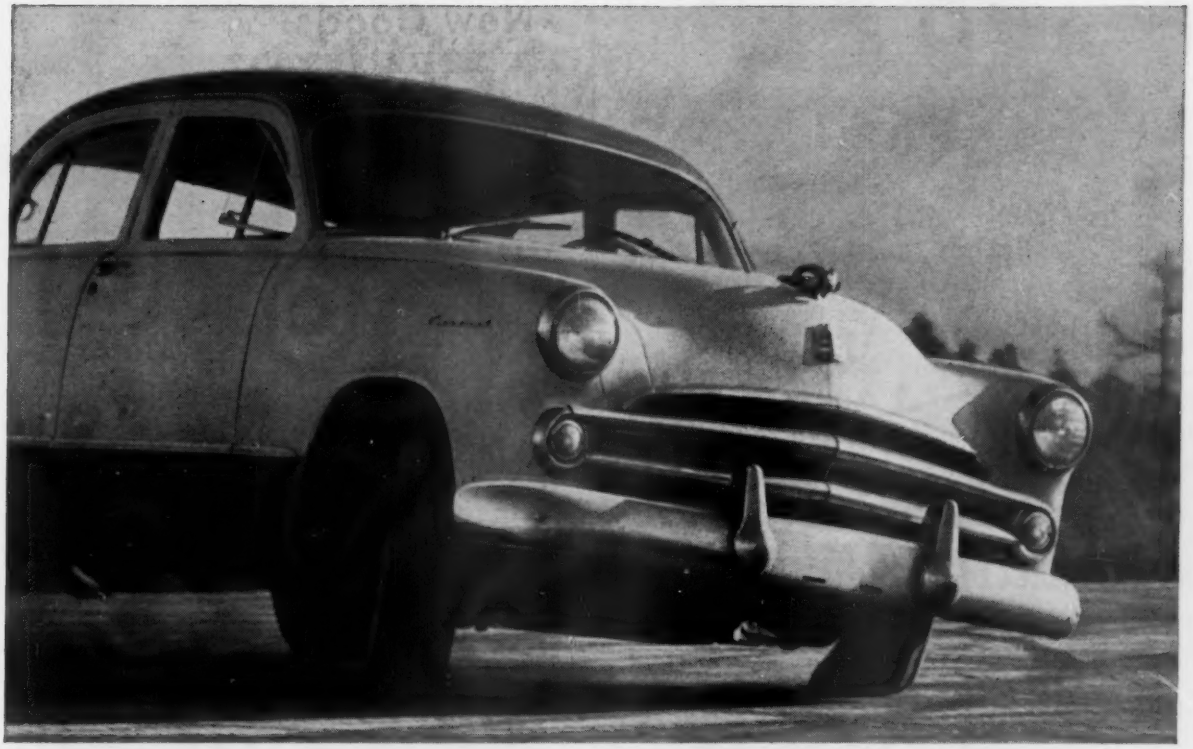
F. O. Holbrook, resident director of the Auburn factory of the Hardie Rubber Co., Ltd., Sydney, Australia, died on June 8. For many years, Mr. Holbrook had been factory manager of the Perdriau Rubber Co. at Drummoyne, New South Wales, and, when that company merged with Dunlop he became controller of factories for the Dunlop Perdriau Co. In 1936, Mr. Holbrook formed the Progress Rubber Co., of which he was managing director until 1946 when, on completion of the amalgamation of Progress Rubber with Hardie Rubber, he became resident director and a member of the board.

Roy L. deBrauwere

Roy L. deBrauwere, assistant vice-president of the Scovill Manufacturing Co. and assistant general manager of A. Schrader's Son Division, died suddenly at his home in Lynbrook, N. Y., on June 18. Mr. deBrauwere started with Scovill over 40 years ago and served in various executive capacities, including purchasing, traffic, advertising and sales. He was well known throughout the automotive trade.

Goodrich has developed a new mildew-resistant, waterproofing material called "Superseal" for application to fire hose jackets.

A new, low-cost general purpose plastisol for coating plating racks has been announced by the Stanley Chemical Co., New Britain, Conn.



FOR TOUGHER, LONGER MILEAGE TUBELESS TIRES THAT DON'T SQUEAL...USE CIRCOSOL-2XH

Taking the objectionable squeal out of the new tubeless tires—without sacrificing abrasion resistance or toughness—is a problem in tread compounding as well as tread design. Tread design, of course, is somebody else's problem. But Sun's Circosol-2XH will solve your compounding problem.

The unique properties of Sun's Circosol-2XH are due to its scientifically controlled balance of naphthenic and aromatic hydrocarbons. By using Circosol-2XH in your tread stock, you can get a tubeless tire with high abrasion resistance, high flex-crack resistance, long mileage...and most important, it will be quiet running.

The cost of these extra advantages of Circosol-2XH is low. Enough Circosol-2XH for an 8.00 x 15 size, 100 level tire costs less than 2¢ more than the cheapest softener you can possibly buy.

Get the full story on both the advantages *and the new low price* of Circosol-2XH from your Sun representative... or write at once to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. RA-7.

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Spreader knife application of base coat, any time prior to lamination, simplifying production schedules.

Lamination and embossing accomplished in one pass, an important processing economy.

Small orders easily processed without upsetting calender schedules.

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IN CANADA: American Resinous Chemicals of Canada, Ltd., 20 Trent Ave., Toronto, Canada

New Goods

Rigid Frame Swimming Pools

A colorful line of rigid frame swimming pools for basement playrooms and backyard fun areas has been introduced by Doughboy Industries, New Richmond, Wisc. In the new line, a heavy canvas liner impregnated with "Pliovic" vinyl resin is used in the pool to provide a tough, pliable, mildew-resistant and waterproof liner. The bottom of the liner is decorated in

three colors and it has a handy outlet for draining water. Designed for ease of assembly, the frames are of light tubular steel which interlock, thus eliminating the need for nuts and bolts. Frame sections are merely slipped into the hems of the liner and locked into place. Four snap-on corner seats are provided for attachment to the tubular frame. The new line comes in five different models ranging from 70 to 430 gallons. All models come complete with repair kit, assembly instructions, and a die-cast aluminum shower which is designed for use with the garden hose.

Security-flex Cable

Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y., has announced a new shuttle-car cable called the "Security-flex", which is said to embody several major improvements that will reduce the chances of failure in mining applications. Shuttle-car cables are ordinarily subject to severe mechanical damage, excessive tension and overload current. According to Anaconda, failures in the past resulted not so much from difficulties with the jacket as from breakdown of the insulation or conductors. This new cable gives physical toughness on the inside as well as on the outside. The Security-flex has a rugged, high-grade, heat-resistant neoprene insulating compound, recommended for operation at 75°C., which increases resistance to puncture, crushing and cutting. The cable jacket is also neoprene. Use of this type of insulation and jacket, according to the company, makes the cable highly flame resistant. Greater protection against short circuits is provided by a patented nylon breaker strip. A high-tensile-strength, fibrous, open-weave web is used over the insulation and fillers under the jacket. Improved stranding of the grounding conductor prevents broken wires and assures continuity of the ground for the life of the cable.

Gerber Baby Doll

Sun Rubber Co., Barberton, Ohio, is manufacturing an all-vinyl doll modeled after the famous "Gerber Baby". The doll comes in 13- and 18-inch sizes, drinks,

wets, cries, blows bubbles and has movable arms and legs. Various baby accessories, as well as Gerber baby foods, are packed with the dolls.

"Saf-Pla" Surfacing Material

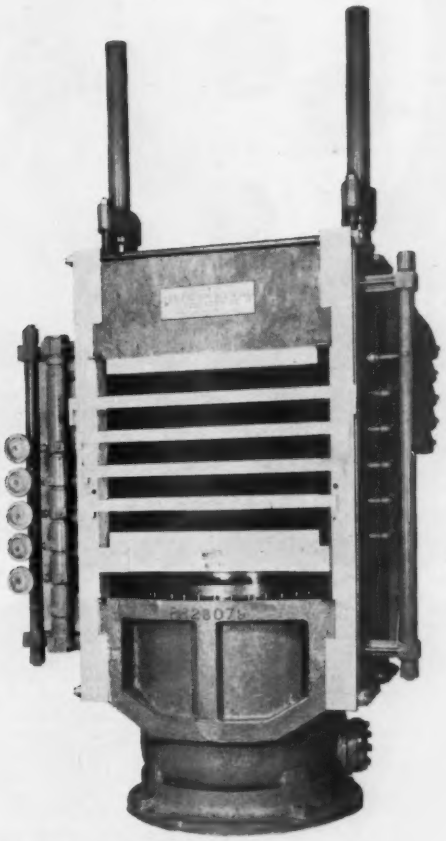
U. S. Rubber Reclaiming Co., P. O. Box 365, Buffalo 5, N. Y., has announced the development of "Saf-Pla", a new playground surfacing material which will reduce the severity of playground injuries. The company states that Saf-Pla is a rubber product that has been scientifically developed. The many advantages of the product, the company states, result from the careful selection of ground rubber particles, asphalts and waxes that are used in its manufacture. The special treatment given Saf-Pla protects the rubber so that it does not absorb and destroy the binder required to hold Saf-Pla in place. The result is a tough, long-lasting surface that will withstand severe abuse. Saf-Pla is easily applied in a short time to black top or concrete surfaces with the use of regular equipment.

Turf King Sprinkler

Quaker Rubber Corp., Tacony and Comly Streets, Philadelphia 24, Penna., has introduced a small sprinkler unit designed for lawns where the area to be watered is under 850 square feet. Called the "Turf King," the new sprinkler can be connected to the outside faucet or to a section of garden hose leading from the faucet. The unit consists of 45 feet of polyethylene pipe and can be buried in a "T" formation, laid straight, or in a semi-circle. Even the distance between the heads can be varied with no decrease in the spray. The Turf King is said to be ideal for terraces, flower beds, out-of-the-way places and small lawns. The sprinkler unit will not rust, rot or corrode and is not harmed by freezing. The risers are shock proof and the water consumption is low.

FRENCH

908 TON
Hot Plate Press



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With Pushback Cylinders

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A PRIMARY PLASTICIZER for chloroprene rubbers, Ohopex R-9 is excellent for end products that require good aging under both high and low temperature conditions.

LONG LIVED TACK in the uncured stock is imparted by Ohopex R-9. According to laboratory tests the uncured stock aged for five weeks at 75° C. loses none of its tack and after 11 weeks the loss is only negligible. An uncured stock with this kind of tack offers many advantages.

LOW TEMPERATURE PROPERTIES imparted by Ohopex R-9 are extremely good with the chloroprene rubbers as indicated by a brittle point of -56° C. After aging 7 days @ 121° C. A. S. T. M. D412 and D865) the low temperature brittle point is unchanged. Other physical properties imparted by Ohopex R-9 exhibit practically no change after aging.

OTHER USES for Ohopex R-9 are as a primary plasticizer for chlorinated and other synthetic rubbers, ethyl cellulose and with vinyls as a permanent secondary plasticizer which produces some interesting properties.

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Insulair Jacket and Vest

The Footwear and General Products Division of the U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y., has introduced two new items of men's clothing: the "Insulair Vagabond Jacket" (shown herewith) and the "Insulair Warmster Vest." The jacket is made of water repellent nylon with an inner lining of

expanded vinyl foam that insulates against cold and wind. Weighing less than three pounds, the Insulair Vagabond Jacket comes in navy, charcoal, red or brown, with or without a mouton collar. The Insulair Warmster Vest is made of cast vinyl with an expanded foam vinyl insulating lining. Colors are red and black. The lining of both the jacket and vest are buoyant enough to float a person and the sizes are small, medium, large and extra large.

Flexsteel Hydraulic Control Hose

The Industrial Products Division of the Goodyear Tire & Rubber Co., Akron, Ohio, has introduced a new, high pressure hose designed specifically for the rapidly expanding hydraulic equipment industry. Called "Flexsteel Hydraulic Control Hose", the new hose is wire-reinforced and is available in sizes from 3/16-inch to 2 inches inside diameter. Depending on size, the hose handles pressures ranging up to 5,500 pounds per square inch. The hose has been field tested and is constructed to meet military, Society of Automotive Engineers and Rubber Manufacturers Association specifications.

Super Airfoot Shoe Cushioning

The Airfoam Division of the Goodyear Tire & Rubber Co., Akron, Ohio, has developed a new shoe cushioning product called "Super Airfoot". The new cushioning is designed for use in ladies' high style and flat shoes, as well as in children's and men's dress shoes. Made of foam rubber, and specially developed for use in closed shoes, Super Airfoot makes possible a thin gauge, yet very firm cushioning, which is said not to detract in any large degree from the customary shoe size.

Fiesta Wall Colored Sidewalls

Goodyear Tire & Rubber Co., Akron 16, Ohio, is manufacturing changeable rubber sidewalls in shades of red, yellow, blue green, pink and white. Called "Fiesta Walls," the new sidewalls are molded rings of rubber, which fit so snugly to the tire that they look like the original sidewall. Installation of the colored sidewalls is quite simple. No special tools or adhesive are required. The Fiesta Wall fits firmly between tire bead and wheel rim and hugs the original tire wall as though molded in place. The bond increases as speed of the wheel is increased. The sidewalls are durable and resistant to stains and scuffing and may be cleaned as easily as any tire. They may be transferred to new tires or to a new car. Operational tests at Goodyear have revealed that this new product is entirely practical, the company states. Fiesta Walls are packaged in sets of four of a single color. Just two sizes fit all popular 15-inch wheels. Mounting instructions are enclosed with each set.

Maltese Cross Hypalon Acid Hose

Hewitt-Robins, Inc., 666 Glenbrook Road, Stamford, Conn., is manufacturing a new type of hose featuring a tube of "Hypalon" chemical rubber which offers exceptional resistance to strong oxidizing acids and other chemicals. Now being introduced commercially after two and one-half years of field trials, the new hose has already given four times the service life of regular acid hose in a chromic acid operation and still shows no signs of failing. Unlike ordinary rubber, Hypalon offers complete resistance to ozone attack and retains its properties even after exposure to temperatures as high as 300°F. The new hose has also proved superior for handling sulfuric acid at a concentration of 98% H_2SO_4 and 15% sodium hypochlorite and 50% sodium hydroxide. The new hose is being marketed as "Maltese Cross Hypalon Acid Hose."

Dayton Cog V-Belt

Dayton Rubber Co., 2342 West Riverview Ave., Dayton 1, Ohio, has developed a heat-resistant cog V-belt for use in such hot spots as baking, coffee roasting, candy and chemical plants. The belt is said to operate perfectly at room temperatures up to 180°F., whereas standard construction belts are said to lose effectiveness when operating at temperatures in excess of 140°F. From this point, standard belts suffer a loss of life at the rate of one-half to two per cent for each degree of increase. The cog feature of the new V-belt eliminates the possibility of the covering or jacket becoming checked or cracked from extreme heat. Since it has no covering material, the cog V-belt dissipates heat rapidly. Made of synthetic rubber, the cog V-belt is impervious to oil and grease damage, as well as to most petroleum derivatives.

A new play "board" of lightweight cellular plastic that can be used in the water by swimmers, non-swimmers or beginners, has been announced by the B. F. Goodrich Sponge Products Division, Shelton, Conn. Called the "Water Wonder", it weighs only 12 ounces yet can support 150 pounds afloat.

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at low cost...

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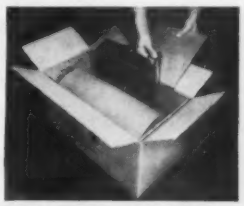
Discover the remarkable qualities of the new types of Patapar Vegetable Parchment. These special Releasing Patapars have dense, fibre free surfaces, and high resistance against penetration or migration of oil and rubber softeners. Their excellent releasing action is unaffected by passage of time. And their low cost will save you money.



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Patapar Releasing Parchments are recommended as a protective backing for pressure sensitive surfaces, separator sheets for uncured, natural or synthetic rubbers, rubber tape and as a wrapping material for tacky substances.

The brochure contains samples of several different types of the new Patapars together with technical data. Why not send for your copy of the brochure today?

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New Equipment

Instron Table Model Tester

A new table model of the Instron universal testing machine has been introduced by the Instron Engineering Corporation of Quincy, Mass. Like the larger instruments it records stress-strain curves under tension or compression. Full scale load ranges from 2 grams to 200 pounds are available through the choice of three load cells. The benefits of inertialess weighing permits

rapid response to load fluctuations in the sample which, with the elimination of mechanical friction, enables a degree of accuracy heretofore unobtainable in an instrument in this price range. The high speed recorder is equipped with a choice of synchronous chart speeds to provide a range of extension magnification.

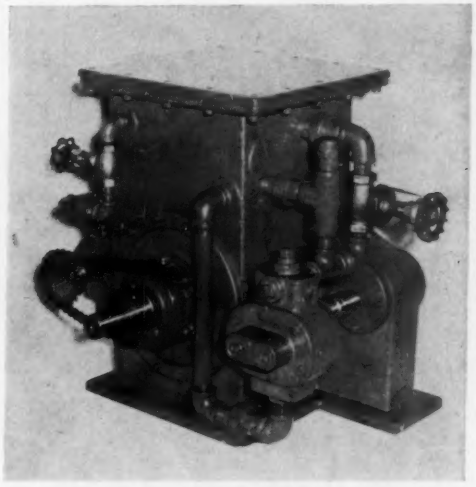
The crosshead is driven synchronously through fast acting magnetic clutches and convenient change gears to provide a choice of constant and reversible testing speeds over a range of 250 to 1. This range can be either from 0.2 to 50 inches per minute or, in an alternate model, from 0.02 to 5 inches per minute, with an available jaw travel of 30 inches. The rapid traverse speed can be selected by similar change gears over a speed range from 50 to 2 inches per minute, or alternatively 5 to 0.2 inches per minute.

An unobstructed space of 3 inches is provided around the crosshead assembly to enable the use of special conditioning chambers, without modification of the unit. Small laboratories can test under controlled conditions without expensive room installations. It also makes possible testing under unusual atmospheric conditions. Accessory equipment is available to meet individual testing requirements.

A **dual-nozzle metering pump** for the rapid ejection of hot or cold cements, sealing waxes and other viscous materials, has been announced by Edward E. Robinson, Inc., Nutley, N. J. The dual nozzle makes it possible to pour approximately equal quantities simultaneously into opposite sides of any mold or cavity when it is not practical to pour into the center of the cavity.

Temco Constant Tension Winder

Designed to provide a smooth, even, constant tension, or tensionless wind, wherever winding is involved, the Temco Constant Tension Hydraulic Winder produced by the Tool Engineering and Manufacturing Co., 134 Thurbers Avenue, Providence, R. I., is a highly versatile, self-contained unit that can wind any thickness, width, weight or type of material at a wide range of linear speeds, tensions, and roll build-ups. The maximum con-



stant linear speed of the material is 3500 fpm. As this linear speed requirement is reduced, the build-up ratio and the total amount of constant tension may remain as they are, or, if desired, one or both of them may be increased in proportion to the decrease in linear speed. The maximum range of constant tension is from 0 to 11,200 pounds total. The maximum build-up ratio of core diameter to finished roll diameter is 1 to 100. On the Temco Winder, a single combination of tension, linear speed, and build-up ratio may be obtained, within the limits described, to suit practically every material processing and winding requirement. The unit is said to be easy to install—simply align the winder with any process machine, connect it to the power supply and it is ready to wind. Once the desired tension has been set on the dial no further attention is required from the operator regardless of the number of rolls wound.

The development of a side drive **mechanical shaft seal** which can be repaired, replaced or converted to a conventional stuffing box while under a full head of pressure has been announced by the New England Tank & Tower Co., Everett, Mass. The unique design incorporates a secondary seal which temporarily seals off the tank while the mechanical shaft seal is being serviced.

"Vapor-Temp," a versatile and accurate **mechanical convection temperature controlled humidity cabinet,** is now available from the Blue M. Electric Co. Blue Island, Ill. The unit automatically controls relative humidity from 20% to near saturated, at any point, depending upon dry bulb temperature.

A NEW Weather-Ometer®

. . . for Weather Testing of Plastic and Rubber Products

MODEL DMC

Greater accuracy and reproducability achieved with new modulated temperature control.

Accuracy in test results is greatly increased in the new DMC Weather-Ometer by a positive control of specimen temperatures.

A constant volume of air at a controlled temperature in the heavily insulated cabinet, maintains uniform predetermined specimen temperatures regardless of variations in room conditions.

Automatic control of humidities up to dew point is available as optional equipment.

All automatic controls including complete voltage controls are located on the front panel of the Weather-Ometer directly above the door of the test chamber.

Both horizontal and vertical testing is available. Shallow containers are used for semi-liquid materials and vertical panels for solid materials.

Source of radiation is two Atlas enclosed violet carbon arcs.

Complete technical information on the DMC model and other Weather-Ometers is contained in the new Weather-Ometer catalog. A copy will be mailed on request.

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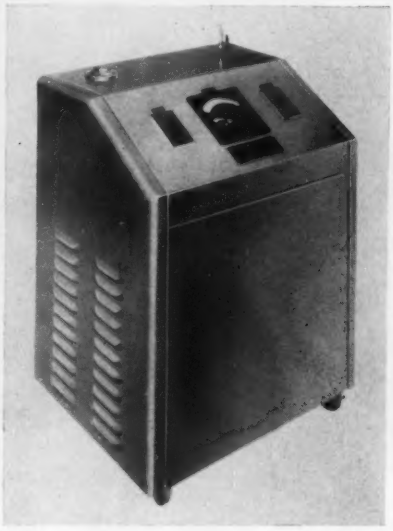
Akron, Boston, Chicago, Los Angeles, Trenton, Albertville, (Ala.)

Mayer Model L-1 Liquid Cooler

A new compact, portable liquid cooler that provides liquid cooling in an operating range of from +60°F. to −20°F. with control within ±¾°F. has been introduced by Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J. Among the advantages claimed for the new unit are that it saves lost time in setting up, lost time in getting on condition, the cost and time of handling dry ice, and the cost of expensive auxiliary control equipment. It also eliminates wasting of materials and duplicate runs due to temperature fluctuations, and conserves time of highly skilled technical personnel. In addition to recirculation of liquid to laboratory apparatus, the unit also has a built-in brine tank that may be used as a bath. Model L-1 is designed for simple and fast operation. Only three steps are necessary: (1) Running hose from liquid cooler to apparatus; (2) Plug electrical cord into wall socket; (3) Set thermostat and start. The unit has a ¾ h.p. Freon compressor, air cooled condenser, 40 to 120 g.p.h. brine pump, 4 gallon brine tank, and a precision indicating type thermostat. The over-all size of the unit is 28 inches wide, 22 inches deep and 34 inches high. It has a shipping weight of approximately 250 pounds.

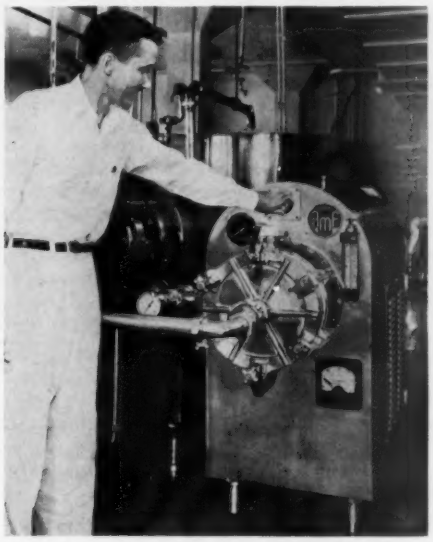


A new **stand-up fork truck** with all the function of the popular Load-Mobile sit-down type is now being manufactured by the Market Forge Co., Everett, Mass. This new truck allows the use of two batteries placed on either side of the operator, without sacrificing mobility and with an increase in performance.

Intended for applications where space limitations prevent the use of the standard Takk static control equipment, the new **Model 100 Takk Special Static Control System,** introduced by the Hewson Co., 443 Broad St., Newark 2, N. J., may also be used where static problems are less severe and processing speeds lower than where the standard high powered equipment is required.

AMF Continuous Mixer

American Machine & Foundry Co., 261 Madison Avenue, New York 16, N. Y., has introduced a new continuous mixer specifically designed for foaming latex or for any mixing operation requiring dispersions with high liquid shear. The production range of the unit varies from 700 to 15,000 pounds an hour, depending on the product. It will incorporate secondary ingredients with complete dispersion of gases or liquids. No



post blending equipment is needed. The unit features a "turbo-shearing" action which is said to produce finer cell structure, a more stable mix, better "keeping" quality and greater uniformity. Of stainless steel construction, the closed system is easily flushed with steam and water. A one-piece mounting spider assures head alignment. There is a continuous bearing surface for the mounting head. Complete exposure of all stator and rotor teeth can be accomplished without removal and the rotor teeth can be cleaned and inspected in place. The pressure-vessel head design allows pressures in excess of 125 psi. Some specific advantages claimed for the unit include greater capacity, easier dismantling and cleaning, and better final foam structure with lower rpm of rotor. The unit seen above finds use in a food plant; however, it is typical of the AMF frothing machine used in the rubber industry.

To provide greater sensitivity, wider range and easier operation, the Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., has redesigned the **Dual Titrometer.** Extremely sensitive, the unit will respond to an electrode current of the order of 10^{-13} amperes A full pH range is measurable to 0.02 pH unit.

The development of the **No. 30 DM Double Motion Change Can Mixer** has been announced by Charles Ross & Son Co., 148 Classon Ave., Brooklyn 5, N. Y. The unit is designed to mix the heaviest materials more thoroughly and in less time than previous types.

COULTER

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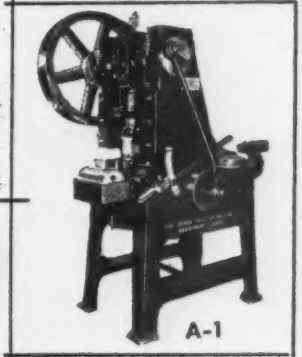
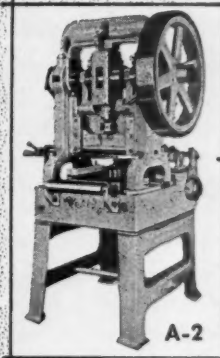


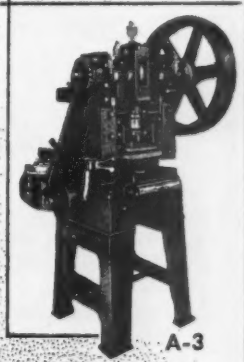


MODEL A-1
Cutting Heels at high speed production or short runs.

MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-2s
(Not illustrated)
Cutting across grain of stock.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.



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Reviews

BOOKS

Some Aspects of the Crystallization of High Polymers. By G. Schuur. (Communication No. 276). Published by Rubber-Stichting, Oostingel 178, Delft, Netherlands. 6¼ x 9½ in. 82 pp. Hfl. 5 (approximately $2.00).

According to the author of this booklet, a high polymer can crystallize in two different manners: On quenching and annealing a polymer crystallizes without the formation of spherulites. Under normal conditions, however, spherulites are formed. This booklet deals chiefly with the formation and structure of the spherulites and a theory is proposed, according to which the spherulites are the result of an internal flow of the material prior to crystallization. Experimental evidence is shown that individual crystallites are non-existent within the spherulites in contradiction to the well-known micellar theory. The crystalline material would be continuous also in oriented fibers and stretched rubbers. The stress-strain curves are discussed on this basis. Finally, some other aspects of the crystallization, such as the crystallization curves, the fact that polymers always crystallize under non-equilibrium conditions, the melting behavior of natural rubber and the crystallization of finely divided particle of polymers in emulsions are discussed in the light of these new conceptions. There are 35 photographs and figures and 101 references, which contain most of the literature about spherulites in high polymers up to October 1954.

•

Mechanical Molded Goods: Neoprene and Hypalon. By D. C. Thompson. Published by Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware. 6 x 9 in. 154 pp.

Although prepared with the present and future applications of neoprene (polychloroprene) and Hypalon (chlorosulfonated polyethylene) in mind, this work is actually a treatise on the molding of mechanical rubber goods, and as such is a most welcome addition to the technical literature. Since the molding techniques employed for both of these elastomers are quite similar to those used for elastomers in general (although molding conditions for Hypalon are somewhat more critical in its present state of development), a review of the fundamentals of molding common to all elastomers was obviously in order. These fundamentals are set down clearly and concisely in this book. Subjects discussed include molding methods, mold design, mold manufacture, preparation of molding compounds, finishing operations, rubber-to-metal bonding, mold cleaning, molding problems, compound formulation, and neoprene and Hypalon compounds for molded goods. Photographs, charts, diagrams and schematic sketches ably abet the text. The book has been specifically designed for new technologists in the rubber field, but older and wiser rubber technologists will find it "useful as an aid in the development of new ideas and the recollection of old ones."

•

Physical Chemistry. By Farrington Daniels and Robert A. Alberty. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 672 pp. $6.50.

Designed to provide material for a first course in physical chemistry, this book is based on the well-known "Outlines of Physical Chemistry" prepared by Dr. Daniels, one of the co-authors of the present work. Although the level of the work has been raised, the book is still elementary in character and offers a simple approach to the principles of physical chemistry. The chapters on crystals, colloids and ionic equilibria have undergone extensive revisions, while new material appears on such subjects as high temperature equilibria, statistical mechanics, microwave spectroscopy, the free energy function, the scattering of light by high polymer solutions, and the mechanism of enzyme catalysis. In all, the book has 20 chapters, an appendix and author and subject indexes.

Plastics in Building. (Publication 337). Published by the Building Research Institute, Division of Engineering and Industrial Research, National Academy of Sciences, National Research Council, 2101 Constitution Ave., Washington 25, D. C. 8½ x 11 in. 150 pp. $5.00.

The contents of this book comprise the views of many of the foremost authorities in the plastics, chemical and building industries concerning the past, present and future uses of plastics in building. These views were first presented at a conference on "Plastics in Building" conducted by the Building Research Institute in the fall of 1954 at Washington, D. C. Also included in the book are selected questions as asked by attendants at the conference, and the answers given by the speakers. Part I of the book is an introduction to plastics in building. This section deals with the kind of plastics, their physical and engineering properties, and evaluation of plastics for building applications. Part II covers specific uses of plastics in building. The uses discussed include light transmitting panels, glazing and interior illumination, thermal insulators and vapor seals, structural panels, surfacing and decorative uses, piping, and ducts and conduits. Part III deals with standards and codes for plastics in building, while Part IV considers future uses of plastics in building. The last part of the book, Part V, summarizes the conference. The book contains 108 illustrations, including drawings, charts and graphs.

•

The Chemical Industry Facts Book. (Second Edition). Issued by the Manufacturing Chemists' Association, Inc., 1625 I St., N.W., Washington 6, D. C. 6 x 9 in. 160 pp. $1.00.

Virtually every facet of the chemical industry is up-dated in this second edition of the "Facts Book." Like the first edition, published two years ago, it is profusely illustrated with charts, graphs and tables, and covers the gamut of the chemical industry from "What the Chemical Industry Makes" to such specifics as "Chemicals and Health" and "Chemicals in Defense." The new edition is somewhat more complete than the first, offering an additional 52 pages of information, including such features as a listing of trade associations and professional societies identified with chemical manufacturing. According to the data presented, the chemical industry experienced a fourfold sales growth from 1939 through 1954. The 1939 sales figure amounted to $4.3 billion as compared with $20.3 billion in 1954.

•

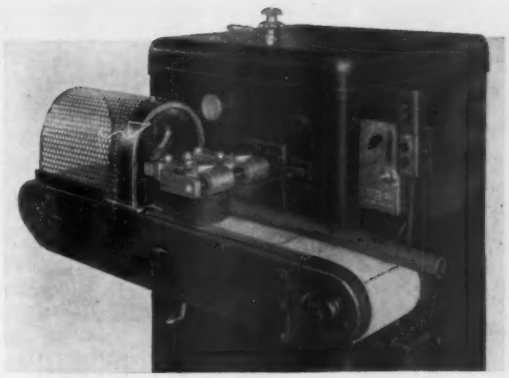
Industrial Textiles Directory. Published by Fairchild Publications, Inc., 7 East 12th St., New York 3, N. Y. 8½ x 11 in. 148 pp. $3.00.

This directory has long been regarded as the most detailed and the most complete of its kind. It gives actual constructions of fabrics made by mills, a comprehensive picture of the types of finish done by each of the various finishing plants, and the counts of yarns made by the various spinning mills. All of this is information which can be of extremely great value to buyers of fabrics and yarns and of textile services, particularly when there is an immediate need for seeking out a source. Of particular interest are the listings of producers of cotton tire fabrics and rayon tire yarn.

•

Tested Approaches to Cutting Production Costs. (Special Report No. 4). Published by the American Management Association, 330 West 42nd St., New York 36, N. Y. 6 x 9 in. 128 pp. $2.50 (members); $3.75 (non-members).

Drawing from material presented at a recent AMA conference, this report shows executives how to determine whether and where costs are out of line. Specialists pinpoint specific areas in which efforts at cost-cutting should be most rewarding. Among the areas of potential cost reduction discussed are: purchasing, indirect labor, materials handling, the manufacturing cycle, quality control, etc.



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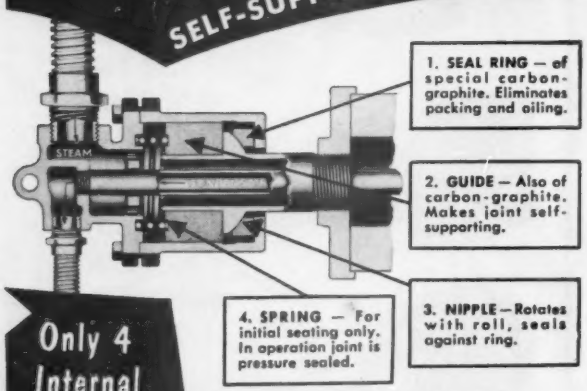
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BOOKLETS, CATALOGS, etc.

Meadol: A Lignin From Hardwood. Mead Corp., Chillicothe, Ohio. 8½ x 11 in. 14 pp.

This publication outlines the properties and industrial applications of "Meadol", an alkali hardwood lignin. Also outlined are the chemical modifications of the product. A section on industrial applications describes the use of Meadol in the asphalt, hardboard, ceramic, foundry (both conventional and shell molding process), ink, latex saturated products, petroleum and oil well drilling, rubber, and electric storage battery industries. It is reported that much experimental work has been done upon the co-precipitation of Meadol with rubber latices, and that certain types of Meadol may be dry-milled into rubber.

•

Vulcan 3 and Vulcan 6 in Natural Rubber Treads. (Report No. RX-24). Godfrey L. Cabot, Inc., 77 Franklin Street, Boston 10, Mass. 8½ x 11 in. 14 pp.

The use of oil furnace blacks in natural rubber tread compounds has been expanding rapidly in world markets. The primary reason for the increasing use of HAF and ISAF types of oil furnace blacks is their ability to deliver longer wearing treads than channel blacks. The superiority of Vulcan 3 (HAF type) and Vulcan 6 (ISAF type) over channel black is reported upon in this bulletin, which offers a presentation of road test data obtained from Cabot's own test cars, combined with information on processing and compounding.

•

Gas Permeability of Rubber Compounds. (Technical Service Laboratory Bulletin No. GD-11). Research Laboratories, Godfrey L. Cabot, Inc., Cambridge, Mass. 8½ x 11 in. 4 pp.

This condensed survey of the available literature on permeability should be of interest in connection with the rapidly expanding use of tubeless tires. Two interesting tables are presented: In Table I, compiled from the literature, values for the permeability constant are given for oxygen and nitrogen in various polymers and at different temperatures; Table II shows permeability constants ($Q \times 10^{-8}$) for compounds of various fillers in natural rubber. A listing of literature of interest is appended.

•

Proceedings of the International Symposium on Abrasion and Wear. (Communication No. 211). Rubber-Stichting, Delft, Holland. 9 x 11½ in. 66 pp.

This attractive publication contains a report of the proceedings of the International Conference on Abrasion and Wear which was held at Delft, Holland, on November 14 and 15, 1951, under the sponsorship of Rubber-Stichting. The ten papers which were presented at that time appear here in printed form. Also published are the discussions which followed the presentation of each paper. The publication is liberally illustrated with photographs, charts and graphs.

•

Propylene Glycol. (Bulletin No. F-8738). Carbide and Carbon Chemicals Co., 30 East 42nd Street, New York 17, N. Y. 8½ x 11 in. 16 pp.

This publication presents data on propylene glycol—its physical and physiological properties, specifications, shipping containers, constant-boiling mixtures, solubilities, and applications. For convenience, the publication has eight easy-to-read charts showing physical properties of interest to users of propylene glycol, an important raw material for polyester resins used in reinforced plastics and as an intermediate for plasticizers.

Hydro-Finish Liquid Blast Cleaning Equipment. (Bulletin No. 1403). Pangborn Corp., P. O. Box 380, Hagerstown, Md. 8½ x 11 in. 8 pp.

This bulletin contains photographs, detailed drawings, dimensions, sizes and features of all models of the "EZ-2" and "EZ-3" hydro-finishing units. It is pointed out that the EZ-2 unit is fitted with a circulating pump to handle the slurry. In the new EZ-3 machines, the pump has been replaced by Pangborn "Sluriators", which are air escapement units located at the sides of the hopper near the bottom. These Sluriators have been placed at an angle and position which provides rapid and thorough agitation of the slurry. The hydro-finish process is said to be especially useful in solving cleaning problems such as deburring, surface finishing and lubrication control, surface preparation for coating, dye and mold maintenance, and also in general maintenance operations.

•

Belgian Rubber Industry. Belgian Office of Exterior Commerce, Brussels, Belgium. 8½ x 11 in. 36 pp.

This handsome booklet describes the rubber industry as it exists in Belgium today, comprising over 100 factories employing over seven thousand persons. Belgium uses most of the natural rubber produced in the Belgian Congo and even a larger quantity imported from the Far East. More than 15,000 tons of crude rubber are consumed annually. Photographs and text describe rubber-growing operations in the Belgian Congo and the manufacture of a variety of products in Belgium, including tires and tubes. The range of products manufactured by the Belgian rubber industry compares favorably with those produced anywhere in the world as is seen by the great variety of end products illustrated and described in this interesting booklet.

•

Galex: A Stabilized Non-Oxidizing Rosin. National Rosin Oil Products, Inc., 1270 Avenue of the Americas, New York 20, N. Y. 8½ x 11 in. 8 pp.

Detailed data on Galex, a non-oxidating rosin specifically compounded for all uses where ordinary rosin is detrimental due to oxidation, are presented in this booklet. Galex, a product of G and A Laboratories, Inc., Savannah, Ga., is recommended for rubber-based pressure-sensitive adhesives because of its low softening point and excellent tack retention. The booklet states that these desirable properties have resulted in its wide-spread use by manufacturers of surgical, industrial, friction and masking tapes.

•

Emersol Oleic Acids. Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio. 8½ x 11 in. 20 pp.

This brochure covers the various means of evaluating oleic acids with emphasis on end-product performance. This includes a discussion of the interpretation of analytical tests normally performed on oleic acid, along with a complete description of the line of Emersol oleic acids and the significance of their outstanding ability and advantages. Also included is a section on handling oleic acid, an end-product selection chart, and a series of useful charts on such properties as viscosity, specific gravity, etc.

•

Sunoco Waxes. (Technical Bulletin No. 22). Sun Oil Co., Philadelphia 3, Penna. 8½ x 11 in. 16 pp.

This new bulletin describes the Sun Oil Company's line of paraffin and microcrystalline waxes. In both tabular and graph form, this bulletin gives the principal characteristics of each of the nine standard tailor-made waxes. Selection of waves according to properties and typical uses is thus simplified. Representative special-purpose wax grades are also covered in this interesting booklet.

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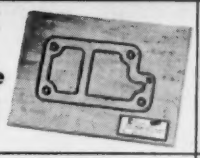
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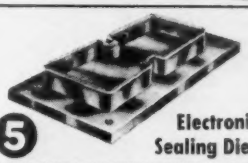
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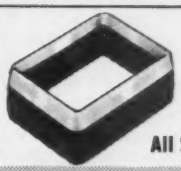
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MARKETS

NEWS-PRICES

NEW YORK, JULY 7, 1955

Natural Rubber

Since our last report (June 6), the price of spot rubber on the New York Commodity Exchange has moved in the wide range of 637 points, high for the period being 39.25c reached on July 5, and low being 32.88c reach on June 8. The average price of spot rubber for the month of June was 34.74c based on 22 trading days. This compares with an average of 31.35c in May.

World rubber prices continue to reflect the tightness in No. 1 Ribbed Smoked Sheets. That the supply and demand situation in this particular grade is tightly balanced has been well publicized by the action of the world rubber markets in recent months. However, it has only been in the last few weeks that No. 1 R.S.S. has moved out in front at the expense of the lower grades and with the differentials progressively widening.

This tightness in No. 1 R.S.S. is said to exist in all of the world's rubber centers. As a matter of fact, a leading Singapore shipper was compelled to default on June shipments of No. 1 R.S.S. due to the inability to obtain sufficient supplies of this grade.

Complicating Factors

Complicating the issue was the dock strike in London, with the end result that nearby prices in that city skyrocketed. The price in London has been so high that efforts have or are being made to re-export rubber from the U. S. to London. Reports have also been heard of rubber enroute being diverted from shipment to North America to London to take advantage of the prevailing premium in the London market.

In Amsterdam, at this writing, No. 1 R.S.S. held at a premium of almost ¾c a pound above No. 1 Thin Latex Crepe. In Singapore, a scramble for rubber for immediate shipment sent prices in that city to the highest levels since March, 1952.

Another element of disturbance has been injected into the situation in the form of political uncertainty. Reports from Indonesia indicate that all is not well between the military and top political factions. If this situation should deteriorate, the complications with reference to rubber markets could be serious.

Ceylon-China Rubber Pact

In a recent statement, the government of Ceylon announced that the total quantity of sheet rubber required to fulfill commitments under the trade agreement with Red China would amount to about 25,000 tons. Judging from present production figures, no sheet rubber would be available for sale in other markets, the statement added.

The government also announced that if rubber market prices continued in excess of the price obtained from Red China under the agreement, steps would be taken to renegotiate the price paid by the government of Red China for the Ceylonese rubber.

From Malaya comes word that ocean shipments in June totaled 77,393 long tons, 2,456 long tons less than in May.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JUNE 7 TO JULY 7

June	Spot	July	Sept.	Dec.	Mar.	Sales
7	33.62	33.75	33.40	33.05	32.50	311
8	32.88	33.17	33.02	32.57	32.00	214
9	33.50	33.82	33.50	33.10	32.40	245
10	33.88	34.05	33.85	33.25	32.55	213
11	....	....	....	....	....	....
12	....	....	....	....	....	....
13	35.38	36.10	35.65	34.80	33.95	469
14	34.75	34.90	34.55	33.95	33.10	251
15	34.88	35.10	34.90	34.20	33.35	122
16	35.00	35.30	35.00	34.25	33.45	161
17	35.50	35.70	35.45	34.70	33.95	261
18	....	....	....	....	....	....
19	....	....	....	....	....	....
20	35.50	35.70	35.52	34.80	33.95	220
21	35.25	35.50	35.25	34.60	33.75	146
22	35.50	35.75	35.50	34.75	34.00	102
23	35.00	35.15	35.00	34.40	33.60	234
24	36.75	37.00	36.75	35.80	34.90	307
25	....	....	....	....	....	....
26	....	....	....	....	....	....
27	37.62	38.00	37.30	36.05	35.00	126
28	36.50	36.90	36.40	35.15	34.25	105
29	36.88	37.10	36.90	35.60	34.60	222
30	37.12	37.40	37.25	36.05	35.00	144
July						
1	37.25	37.60	37.25	36.25	35.10	98
2	....	....	....	....	....	....
3	....	....	....	....	....	....
4	....	....	....	....	....	....
5	39.25	39.65	39.35	37.70	36.40	228
6	39.00	39.25	38.95	37.25	35.80	111
7	38.25	38.60	38.45	36.60	35.40	209

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.38¼
July	.38¼
August	.38⅛
Thin Latex Crepe:	
Spot	.40
Thin Brown Crepe, No. 2	.34½
Flat Bark Crepe	.31¼

London Market

(Standard Smoked Sheets)

August	42.06 - 42.35
Oct.-Dec.	38.14 - 38.43

Singapore Market

(Standard Smoked Sheets)

August	38.79 - 38.87

Middling Upland Quotations

	June 6	July 7		
	Close	High	Low	Close
July	33.82	34.03	33.96	34.02
Oct.	33.97	34.20	34.13	34.17
Dec.	34.00	34.36	34.31	34.36

Notes and Quotes

A suggestion which, if followed, could have far-reaching effects on world rubber markets has been advanced by John L. Collyer, chairman of the B. F. Goodrich Co. Mr. Collyer, in a recent letter to Arthur S. Flemming, director of the Office of Defense Mobilization, urged sale of part of the government's million-ton-plus stockpile of natural rubber.

Mr. Collyer declared that "the government's crude rubber stockpile affords an opportunity to reduce the taxpayer's burden through orderly sale of 200,000 tons". His company's studies, Mr. Collyer said, "lead us to believe that a total of 900,000 tons of crude rubber in the government stockpile and in private stocks would be adequate in a five-year all out war, based on the assumption that we would not be able to import a single additional pound during the five-year period."

Mr. Collyer added that it was questionable whether an all-out war fought with today's weapons could last as long as five years. He estimated that the total tonnage of natural rubber now in the United States was about 1,300,000 long tons.

Synthetic Rubber

The introduction of bills in the House of Representatives and in the Senate calling for the sale of the synthetic rubber facility at Institute, West Va., came as a surprise to many in the trade. It had long been considered that this, the remaining and unaccounted for facility in the government's disposal plans, would remain in standby for the three-year period prescribed by law.

Considered by most industry observers as a "white elephant", the Institute plant is poorly located in respect to raw materials. In addition, it is equipped to produce only "hot" rubber, and has a capacity far greater than even the major rubber-producing firms can utilize.

The prospective purchasers, Carbide and Carbon Chemicals Co., have stated that they will definitely bid for the facility if it can be put up for sale without restrictions as to its future use. They would also eliminate provisions of the old sale regulations that would require the plant to be maintained as a synthetic rubber producer for a period of ten years.

Plan to Convert Plant

It is apparently Carbide and Carbon's intention to convert the plant to the production of chemicals and plastics, if it is sold. But whether Congress will take all of these facts into consideration and look kindly on the sale for non-rubber use is problematical. It will be remembered that the alcohol-butadiene plant at Kobuta, Penna., purchased by the Koppers Co., was only sold after company officials agreed to keep its facilities intact.

Whatever the outcome of the projected Institute plant sale, the activities of the Rubber Producing Facilities Disposal Commission in accomplishing the sure sale of twenty-five facilities and the leasing of another can only be characterized as remarkable.

What is even more striking is the fact that according to the latest figures prepared by the Disposal Commission, the government stands to receive $10,000,000 more from the sale of the synthetic rubber facilities to private interests than was originally put into them.

The Disposal Commission said taxpayers were out of pocket $128,088,000 net construction costs for the twenty-seven synthetic rubber plants rushed into being during World War II. In addition, it said, operating and non-operating deficits amounting to $132,700,000 raised the total net costs to the taxpayer to $260,788,000.

Thus, sale of the twenty-five plants for over $270,000,000, represented a recovery of some $10,000,000 more than net costs. In addition, the government is also receiving from plant purchasers about $145,000,000 for inventories, spare parts, plant additions, and other cash arising from liquidation of the synthetic rubber producing facilities. The government still owns two plants—Institute and the alcohol-butadiene plant at Louisville, Ky., which has been leased to Publicker Industries, Inc. of Philadelphia, Penna.

German Synthetic Industry

It is reported that the "Big Three" of the German chemical industry have embarked on a large-scale project for the production of synthetic rubber. Present plans call for an annual output of 45,000 long tons by 1958. It is said that a capital outlay of 130,000,000 marks will be sufficient for the new venture. Reports state that "cold" rubber will be produced and German technicians are currently investigating American processes.

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [2]
Butaprene NF	.4900 [2]
Butaprene NL	.5000 [2]
Butaprene NXM	.5800 [2]
Chemigum 30N4NS	.5000 [2]
Chemigum 50N4NS	.5000 [2]
Chemigum N3	.5800 [2]
Hycar OR-15	.5800 [2]
Hycar OR-25	.5000 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [2]
Polysar Krynac	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar SS-250-K	.3000 [2]

Butadiene-Styrene Types

ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
Butaprene S-1000	.2300 [2]
Butaprene S-1001	.2300 [2]
Butaprene S-1002	.2455 [2]
Butaprene S-1004	.2300 [2]
Butaprene S-1005	.2455 [2]
Butaprene S-1006	.2300 [2]
Butaprene S-1009	.2455 [2]
Butaprene S-1010	.2300 [2]
Butaprene S-1012	.2430 [2]
Butaprene S-1013	.2430 [2]
Butaprene S-1014	.2480 [2]
Butaprene S-1015	.2455 [2]
Butaprene S-1500	.2300 [2]
Butaprene S-1502	.2300 [2]
Butaprene S-1703	.1950 [2]
Butaprene S-1705	.1925 [2]
Butaprene S-1710	.1775 [2]
Butaprene S-1712	.1775 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1712	.1712 [2]
G-G 1001	.2410 [2]
G-G 1002	.2435 [2]
G-G 1006	.2410 [2]
G-G 1500	.2410 [2]
G-G 1501	.2410 [2]
G-G 1502	.2410 [2]
G-G 1703	.2060 [2]
G-G 1705	.2035 [2]
G-G 1706	.2035 [2]
G-G 1707	.1910 [2]
G-G 1709	.1885 [2]
G-G 1710	.1885 [2]
G-G 1711	.1885 [2]
G-G 1712	.1885 [2]
Hycar OS-10	.5500 [2]
Naugapol 1016	.2550 [2]
Naugapol 1018	.2600 [2]
Naugapol 1019	.2550 [2]
Naugapol 1021	.2900 [2]
Naugapol 1022	.2600 [2]
Naugapol 1023	.2650 [2]
Naugapol 1503	.2550 [2]
Naugapol 1504	.2650 [2]
Philprene 1000	.2500 [1]
Philprene 1001	.2500 [1]
Philprene 1006	.2500 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2575 [1]
Philprene 1019	.2525 [1]
Philprene 1500	.2500 [1]
Philprene 1502	.2500 [1]
Philprene 1600	.2000 [1]
Philprene 1601	.2000 [1]
Philprene 1602	.2000 [1]
Philprene 1605	.1940 [1]
Philprene 1703	.2120 [1]
Philprene 1706	.2100 [1]
Philprene 1708	.1970 [1]
Philprene 1711	.1940 [1]
Philprene 1712	.1712 [1]
Philprene 1803	.1800 [1]
Plioflex 1000	.2425 [2]
Plioflex 1006	.2425 [2]
Plioflex 1502	.2425 [2]
Plioflex 1703	.2075 [2]
Polysar Krynol	.1890 [2]
Polysar Krynol NS	.1940 [2]
Polysar "S" Types	.2300 [2]
SC-1000	.2300 [2]
SC-1001	.2300 [2]
SC-1006	.2300 [2]
SC-1100	.1850 [2]
SC-1500	.2300 [2]
SC-1501	.2300 [2]
SC-1502	.2300 [2]
SC-1600	.1850 [2]
SC-1602	.1850 [2]
SC-1703	.1950 [2]
SC-1706	.1925 [2]
SC-1707	.1800 [2]
SC-1709	.1775 [2]
SC-1712	.1775 [2]
SC-1801	.1700 [2]
Texas-U. S. 1000	.2425 [2]
Texas-U. S. 1001	.2425 [2]
Texas-U. S. 1002	.2450 [2]
Texas-U. S. 1006	.2425 [2]
Texas-U. S. 1007	.2425 [2]
Texas-U. S. 1009	.2475 [2]
Texas-U. S. 1012	.2425 [2]
Texas-U. S. 1013	.2500 [2]
Texas-U. S. 1500	.2425 [2]
Texas-U. S. 1703	.2075 [2]
Texas-U. S. 1707	.1925 [2]
Texas-U. S. 1711	.1900 [2]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl Types	.2300 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WRT	.4500 [2]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.95 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

Any Changes in the Information Previously Submitted for the

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MARKETS

NEWS-PRICES

NEW YORK, JULY 7, 1955

Reclaimed Rubber

With the approach of the July vacation period, reclaimed rubber plants operated at high levels during the past period so as to meet demands of consumers. The two-week vacation period coincides for most reclaim plants with the end result that July will show up statistically as a slow month. Within the past few weeks several reclaimers have adjusted their prices, raising the differential between c.l. and l.c.l. shipments from ½ to ¾c a pound.

Preliminary figures released by the Department of Commerce indicate that in the first four months of this year 106,829 long tons of reclaimed rubber were produced and 267 long tons were imported, making a total new supply of 107,096 long tons.

In the same period, 104,919 long tons of reclaim were consumed. Stocks on hand as of April 30 stood at 29,785 long tons. In the first four months of 1954, 85,893 long tons were produced, 296 imported, making a total new supply of 86,189 long tons. In the same period, 83,340 long tons were consumed.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14¼
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.15
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Butyl tubes continued to display considerable strength in the scrap rubber market during the past few weeks. Some sources point out that the higher levels to which Butyl tube prices have been advancing appeared to be bringing out more material than could be easily absorbed. Some factors feel that the continued heavy offerings might weaken currently quoted prices.

According to the Bureau of the Census, exports of scrap rubber rose sharply in February, while imports in the same month were slightly lower. Scrap rubber shipments overseas amounted to 3,685,509 pounds valued at $111,764 in February, or 2,268,594 pounds more than the 1,416,915 pounds, worth $43,369, which were shipped in January. The sharp increase in exports reflected larger shipments to Canada, Spain, Japan and West Germany.

(Prices Delivered Akron)

Mixed tires	ton	15.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.05¾
Butyl Rubber Tubes	lb.	.07¼

Tire Fabrics

The industrial fabrics market is continuing to display a very firm tone even though actual sales volume of wide fabrics for plastic coating and most cotton ducks has been falling off somewhat in recent weeks. Substantial quantities of hose and belting ducks and chafer fabrics, however, were sold by mills in the last few weeks to rubber manufacturers for delivery in August.

Transactions in these goods took place at current market levels with a heavy call reported for belting ducks. In chafers, the heaviest sales took place in the 11.65 ounces, singles, fabric for delivery in August.

Wide Coating Fabrics

The firm tone in wide coating fabrics, which have been selling heavily in weeks past, was indicated by an advance in the price of the 59-inch, 1.85 yard drill. A few mills were also quoting higher prices on the 59-inch, 2.35 yard drill.

The supply of wide drills is said to be very tight for quick or nearby delivery and, generally, mills are tightly sold on these goods well into August. Large lots of wide drills have been sold for delivery in August as a result of the settlements in the labor-management negotiations in the automobile industry.

Substantial sales were also made by some mills on wide drills, sateens and broken twills for delivery in July, August and September. The volume of goods sold through the third quarter in sateens and broken twills, however, was relatively light. The bulk of trading in wide sateens and broken twills took place for July delivery.

In cotton ducks, including Army and numbered types, trading has been spotty in recent weeks, as buyers tended to hold off on further commitments due to the approach of plant vacations and maintenance closings.

Top Rayon Producer

According to the Textile Economics Bureau, the United States remains the world's largest producer of rayon and acetate, this country's 1954 output of 1,085,700,000 pounds being 24% of the total which compares with 29% in 1953 and a peak of 50% of the 1946 world total. The U. S. capacity is 28¼% of the world total today and is expected to be 28½% in 1956.

Japan was the second largest world producer of rayon and acetate last year with a total of 632,900,000 pounds, or 14% of the total. Other countries which topped the 100,000,000 pound mark in 1954 include the United Kingdom, West Germany, Italy and France.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.66½
11.65 oz. (per square yard)	lb.	.62
8.9 oz. (per square yard)	lb.	.68

Liquid Latex

Natural: Reflecting the rising prices shown for dry natural rubber, the spot price of A.S.T.M. Centrifuged Concentrate Hevea latex, tank car quantities, f.o.b. East Coast, has been hovering about the 52c per pound solids level. Within the past month, prices have risen almost 10c per pound.

Trade estimates indicate that in the first four months of the current year, slightly more than 30,000 long tons of natural rubber latex were imported, about 8,000 long tons more than were imported in the first four months of the preceding year.

Commerce Department figures indicate that in the first four months of 1955, 30,622 long tons of natural rubber latex were consumed. In the same period of the previous year, 23,979 long tons were consumed. At the end of April, 1955, there were 6,576 long tons on hand.

Synthetic: According to the Department of Commerce, 24,177 long tons of GR-S latex were produced in the first four months of 1955. In the first four months of 1954, 16,195 long tons were produced. Consumption of GR-S latex in the first four months of 1955 amounted to 20,241 long tons, against 14,733 long tons consumed in the comparable period of 1954. As of April 30, 1955, there were 3,243 long tons of GR-S latex on hand.

As for neoprene latex, in the first four months of the current year, 3,243 long tons were produced and 2,938 long tons consumed. As of April 30, there were 756 long tons in stocks on hand. In the first four months of 1954, 2,846 long tons were produced and 2,522 long tons consumed. Production of N-type latices in the first four months of 1955 amounted to 2,959 long tons while consumption totaled 2,039 long tons.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of 45 points since our last report (June 6), high for the period being 35.10c reached on June 17, and low being 34.65c reached on June 6. The average price of middling uplands for the month of June was 34.83c based on 22 trading days. This compares with an average of 34.80c in May.

The U. S. government has sold about $370,000,000 worth of surplus cotton — about 2,000,000 bales — for foreign currencies in fiscal 1955, according to statistics of the International Cooperation Administration (formerly Foreign Operations Administration), and the Department of Agriculture. Figures show that the Agriculture Department has made agreements covering 647,000 bales worth about $124,000,000, while the FOA authorized about $248,000,000 worth, or about 1,400,000 bales.

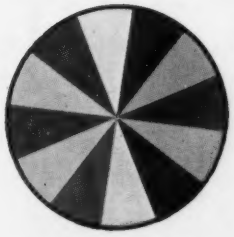
India's 1954-55 cotton crop may exceed 4,000,000 bales (500 pounds gross), 7% higher than the 1953-54 crop of 3,780,000 bales, according to advices from Bombay. The Indian government has announced a reduction in the export duty on all varieties of Indian cotton and allowed an additional export quota of 150,000 bales.

A record cotton crop of about 2,000,000 bales is expected in Mexico for the 1955-56 crop year. A considerable increase in irrigated land planted to cotton is expected to increase production 12 to 15% over the previous record crop of 1,780,000 bales in the 1954-55 crop year.

POLYPOL S-70

for

COLOR



POLYPOL S-70 combines excellent physical properties with definite color advantages. Used in combination with clays, silicate pigments, or calcium carbonate and titanium dioxide and various coloring agents, good colors from dark brown to tan or "oak" can be obtained. Even for black or very dark goods, POLYPOL S-70 can provide non-marking products of high quality.

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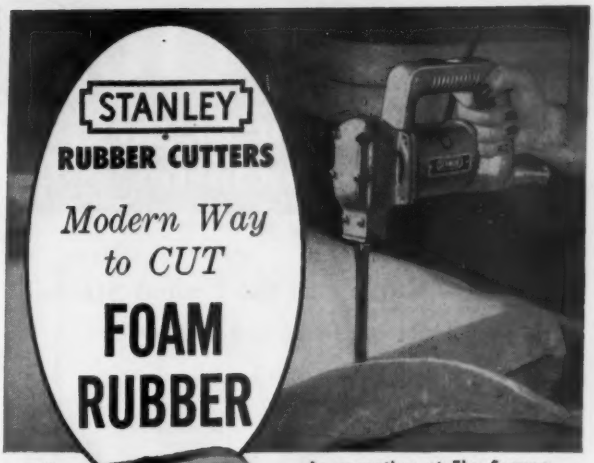

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RECLAIMING OILS
PLASTICIZERS
POWDERED RUBBER

STATISTICS

of interest to the rubber industry

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1926	417,643	366,200	17,671	72,510
1927	431,246	373,000	27,775	99,282
1928	439,731	437,000	32,159	65,454
1929	565,087	467,400	36,485	118,609
1930	487,628	376,000	30,205	201,000
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1954:				
Sept.	48,618	52,412	499	119,191
Oct.	49,432	55,970	904	115,970
Nov.	45,474	53,326	798	105,025
Dec.	43,557	55,096	775	102,943
1955:				
Jan.	49,941	56,911	909	101,050
Feb.	50,880	50,997	718	97,189
Mar.	61,250	58,472	691	102,058
Apr.	60,408	52,954	705	101,538
May	55,772	54,774	750	109,613

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry: Long Tons	Dry: Declared Value	Latex: Long Tons	Latex: Declared Value	Total Imports
1937	574,600	237,307,041	23,185	10,213,670	597,785
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954:					
Aug.	51,553	22,840,397	7,571	4,374,067	59,124
Sept.	42,138	18,658,983	6,480	3,904,819	48,618
Oct.	42,221	19,902,225	7,210	4,469,492	49,431
Nov.	39,139	19,244,326	6,335	3,944,396	45,474
Dec.	34,668	18,272,151	8,889	6,208,294	43,557
1955:					
Jan.	42,088	22,245,606	7,853	5,473,260	49,941
Feb.	44,770	26,161,643	6,110	4,196,213	50,880
Mar.	53,639	33,482,831	7,611	5,987,304	61,250

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America	Rest of World*	Total*
1943	75,000*	100,000*	105,500	70,370	41,900	72,507	465,000
1944	25,000*	50,000*	98,500	60,419	49,946	77,000	360,000
1945	8,600*	10,000*	97,500	12,000*	47,125	73,570	250,000
1946	403,719	175,000*	94,000	19,975	39,678*	105,080	837,500
1947	646,362	277,951	89,000	38,128	34,928*	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158*	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318*	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902*	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777*	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475*	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318*	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833*	280,112	1,802,500
1954:							
Sept.	53,552	68,769	8,229	6,644	2,322*	23,741	162,500
Oct.	50,251	69,874	7,545	7,771	2,505*	24,419	162,500
Nov.	54,834	54,899	9,893	8,963	2,621*	25,313	157,500
Dec.	54,645	70,282	11,157	10,223	2,282*	30,264	180,000
1955:							
Jan.	57,181	40,719	9,614	5,926	500*	22,618	140,000
Feb.	48,934	70,651	4,485	1,973	500*	28,128	155,000
Mar.	54,229	47,394	4,892	4,231	500*	19,897	135,000
Apr.	44,775	48,225	7,000	....	....	....	132,500

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1943	488,525	66,730	32,896	150,000	156,104	907,500
1944	710,783	86,977	34,310	132,500	160,690	1,125,000
1945	799,009	91,047	41,836	87,500	108,164	1,127,500
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,452	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	545,250	393,844	2,507,500
1954:						
Aug.	80,120	15,975	4,774	39,750	39,476	180,000
Sept.	106,290	21,187	6,269	47,250	41,231	222,500
Oct.	114,279	25,067	5,756	49,500	31,994	227,500
Nov.	110,613	20,715	6,503	49,500	32,747	220,000
Dec.	119,226	21,238	6,236	49,250	32,764	227,500
1955:						
Jan.	125,290	24,645	6,126	45,500	35,874	237,500
Feb.	118,611	21,238	6,936	44,000	30,814	220,000
Mar.	135,287	22,648	7,505	48,225	42,000	247,500
Apr.	124,775	24,775	....	48,000	41,225	237,500

Source: International Rubber Study Group. * Estimated.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

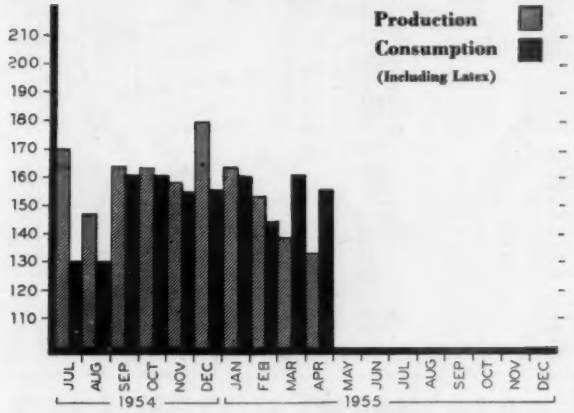
Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166,837	235	303,116
1954:						
June	87	36,745	318	392,687	97	126,979
July	104	54,957	201	240,477	24	37,749
Aug.	30	23,404	151	200,944	58	68,298
Sept.	107	43,193	313	335,832	37	32,492
Oct.	85	49,323	263	328,656	14	24,116
Nov.	108	76,392	156	188,426	27	49,170
Dec.	83	49,271	145	169,503	17	20,087
1955:						
Jan.	41	48,160	205	247,639	12	24,628
Feb.	28	24,321	129	102,572	37	36,566
Mar.	72	48,365	184	205,480	36	48,134

Source: U. S. Department of Commerce.

STATISTICS at a glance

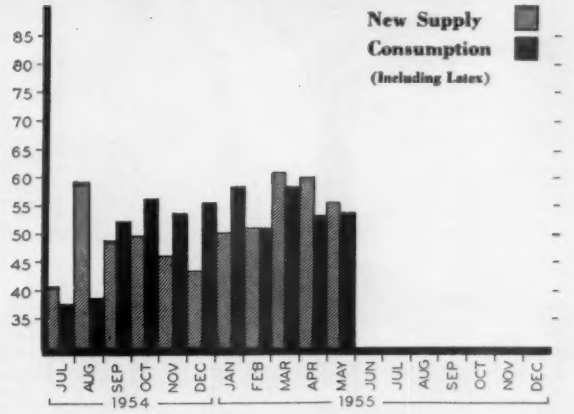
NATURAL RUBBER—WORLD

(thousands of long tons)



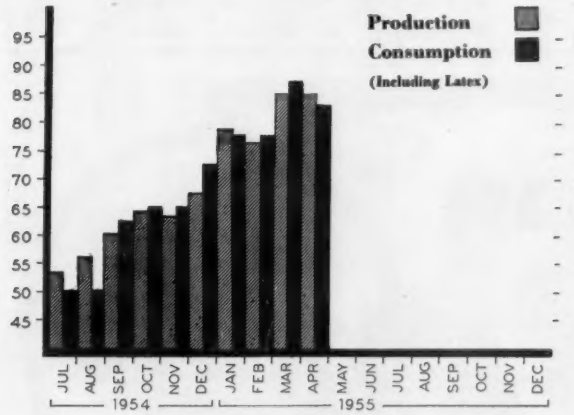
NATURAL RUBBER—UNITED STATES

(thousands of long tons)



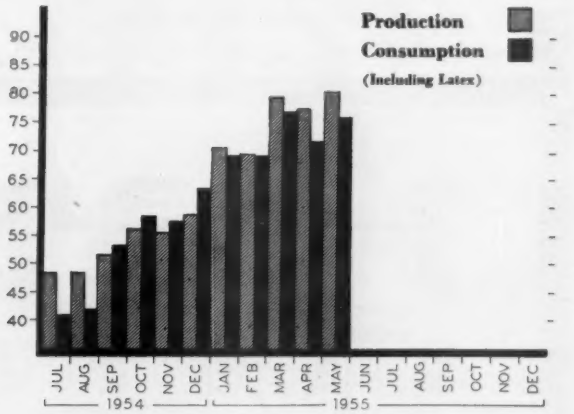
SYNTHETIC RUBBER—WORLD

(thousands of long tons)



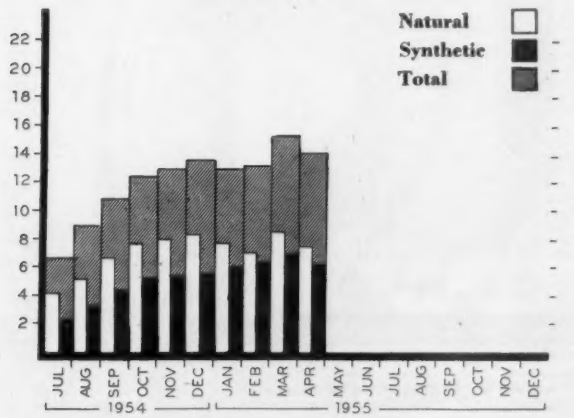
SYNTHETIC RUBBER—UNITED STATES

(thousands of long tons)



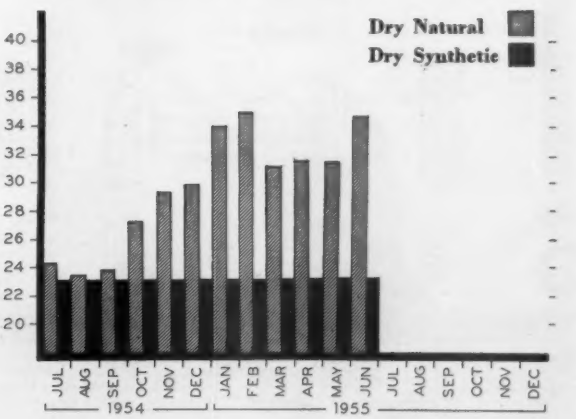
LATEX CONSUMPTION IN THE U. S.

(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC

(cents per pound)



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447
1953	680,728	80,495	79,801	20,198	861,222
1954	490,405	69,150	58,802	21,396	639,753
1954:					
Sept.	41,120	6,036	4,675	1,718	53,549
Oct.	43,938	6,644	5,117	1,864	57,563
Nov.	43,130	6,839	5,060	1,913	56,942
Dec.	47,356	6,206	4,666	2,068	60,296
1955:					
Jan.	59,043	6,983	3,220	2,099	71,345
Feb.	56,442	6,910	3,727	1,729	68,808
Mar.	65,169	7,132	5,256	2,158	79,715
Apr.	60,072	8,359	5,097	2,534	76,062
May	62,889	7,852	5,081	3,122	78,944

Consumption

1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	66,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037
1953	624,181	65,900	77,826	16,929	784 836
1954	500,345	57,203	61,464	17,715	636,727
1954:					
Sept.	42,198	5,049	5,138	1,493	53,878
Oct.	47,063	4,931	4,711	1,604	58,309
Nov.	46,409	5,276	3,967	1,635	57,287
Dec.	52,475	5,434	4,583	1,638	64,130
1955:					
Jan.	56,371	5,676	4,478	1,854	68,379
Feb.	56,000	5,476	4,312	1,826	67,614
Mar.	63,737	6,423	4,839	2,119	77,118
Apr.	59,439	5,899	4,312	2,078	71,728
May	62,933	6,164	4,444	2,096	75,637

Exports

1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101
1953	7,692	11,494	237	3.245	22.668
1954	11,069	12,062	2,831	4,155	30,117
1954:					
Sept.	785	978	53	270	2,086
Oct.	1,284	1,301	189	455	3,229
Nov.	659	1,081	575	433	2,748
Dec.	994	1,088	140	396	2,618
1955:					
Jan.	1,381	1,046	716	194	3,337
Feb.	1,331	1,049	370	259	3,009
Mar.	2,162	1,287	672	236	4,357
Apr.	1,747	1,168	521	247	3,683
May	....	....	....	....	....

Stocks

1946	81,486	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987
1953	135,153	11,480	24,866	4,346	175,845
1954	115,499	11,349	19,267	4,280	150,395
1954:					
Sept.	128,313	10,288	18,513	4,548	161,662
Oct.	127,204	11,038	18,653	4,272	161,167
Nov.	121,772	11,429	19,338	4,366	156,905
Dec.	115,499	11,349	19,247	4,080	150,175
1955:					
Jan.	114,976	11,598	17,079	4,160	147,813
Feb.	111,796	10,555	15,424	3,885	141,660
Mar.	113,594	11,037	15,096	3,786	143,513
Apr.	112,817	10,871	14,811	3,342	141,841
May	112,473	11,559	14,981	4,196	143,209

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1943	1,890	194	1,512	.....	1,706	3,596
1944	3,090	6,580	4,683	.....	11,263	14,353
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4,164	54,035	102,263
1953	75,511	48,112	9,026	5,844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1954:						
May	3,806	3,838	680	623	5,141	8,947
June	6,590	4,019	620	585	5,224	11,814
July	5,236	2,589	448	643	3,680	8,916
Aug.	7,571	1,995	756	682	3,433	11,004
Sept.	6,480	4,190	676	581	5,447	11,927
Oct.	7,210	5,190	742	780	6,712	13,922
Nov.	6,335	5,115	717	558	6,390	12,725
Dec.	8,888	5,238	729	624	6,591	15,479
1955:						
Jan.	7,853	6,199	617	624	7,440	15,293
Feb.	6,110	5,634	797	641	7,072	13,182
Mar.	7,611	7,078	854	672	8,604	16,215
Apr.	8,550	5,680	975	1,022	7,677	16,227
May	7,456	....	....	....	....	....

Consumption[1]

1943	9,578	150	1,400	....	1,550	11,128
1944	6,085	6,000	4,400	....	10,400	16,485
1945	3,886	14,500	6,800	....	21,300	25,186
1946	5,714	23,500	13,000	....	36,500	42,214
1947	13,909	22,500	6,500	....	29,000	42,909
1948	28,489	21,500	5,250	....	26,750	55,239
1949	36,117	21,500	3,750	....	25,250	61,367
1950	56,138	31,000	5,500	....	36,500	92,638
1951	46,750	31,031	6,279	2,628	39,938	86,688
1952	53,567	40,562	7,368	3,093	51,023	104,590
1953	67,375	46,473	7,981	3,654	58.108	125.483
1954	75,931	44,173	7,251	4,507	55,931	131,862
1954:						
May	5,969	3,394	586	348	4,328	10,297
June	5,884	3,653	629	402	4,684	10,568
July	4,298	2,587	482	296	3,365	7,663
Aug.	5,228	2,834	561	351	3,746	8,974
Sept.	6,903	3,599	628	379	4,606	11,509
Oct.	7,527	4,347	612	376	5,335	12,862
Nov.	7,622	4,411	631	411	5,453	13,075
Dec.	7,671	4,575	600	460	5,635	13,306
1955:						
Jan.	7,355	4,537	661	506	5,704	13,059
Feb.	7,066	4,881	689	501	6,071	13,137
Mar.	8,415	5,861	828	509	7,198	15,613
Apr.	7,786	4,962	760	523	6,245	14,031
May	6,846	....	....	....	....	....

Stocks at End of Period

1943	5,638	....	....	....	....	5,638
1944	2,443	....	....	....	....	2,443
1945	3,121	....	....	....	....	3,121
1946	4,865	....	....	....	....	4,865
1947	5,033	....	....	....	....	5,033
1948	11,235	....	....	....	....	11,235
1949	5,063	....	....	....	....	5,063
1950	4,927	....	....	....	....	4,927
1951	4,752	3,727	1,245	532	5,504	10,256
1952	6,201	5,040	1,019	902	6,961	13,162
1953	13.532	4.794	1,117	721	6,632	20,164
1954	11,133	5,134	1,087	811	7,032	18,165
1954:						
May	8,907	5.180	1,110	655	6,945	15,852
June	9.460	5,591	1,020	646	7,257	16,717
July	10,171	5,363	1,004	831	7,198	17,369
Aug.	12,009	4,220	1,019	993	6,232	18,241
Sept.	11,546	4,504	984	908	6,396	17,942
Oct.	10,952	4,745	1,001	950	6,696	17,648
Nov.	9,759	4,943	1,055	939	6,937	16,696
Dec.	9,933	5,134	1,087	811	7,032	16,965
1955:						
Jan.	9,684	5,861	1,067	812	7,740	17,424
Feb.	8,619	5,753	879	663	7,295	15,914
Mar.	7,820	6,940	909	637	8,486	16,306
Apr.	6,576	7,006	756	610	8,372	14,948
May	8,980	....	....	....	....	....

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950.

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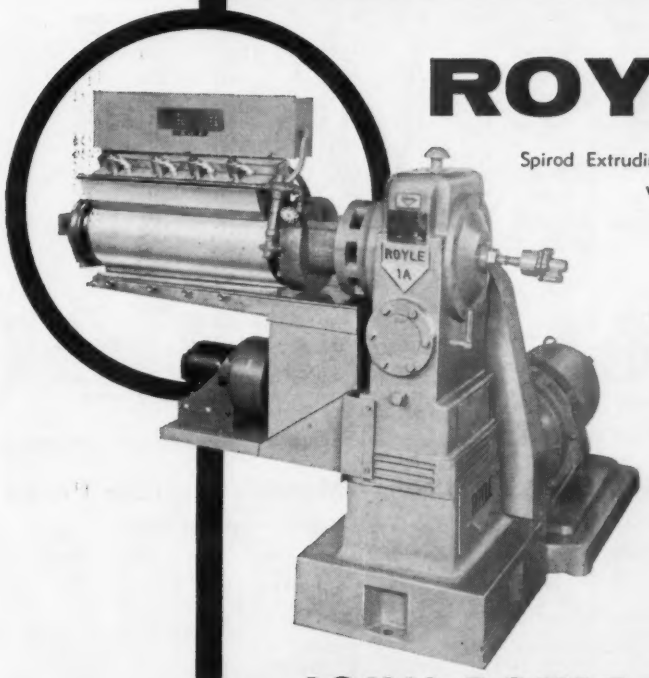

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PATERSON 3, NEW JERSEY

Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1954 Production Workers (thousands)	1954 Average Weekly Earnings	1954 Average Weekly Hours	1954 Average Hourly Earnings	1955 Production Workers (thousands)	1955 Average Weekly Earnings	1955 Average Weekly Hours	1955 Average Hourly Earnings
Jan.	205.7	$75.08	38.7	$1.94	211.0	$84.25	41.3	$2.04
Feb.	202.9	75.47	38.9	1.94	212.0	84.05	41.2	2.04
Mar.	199.4	74.31	38.5	1.93	214.3	....	....	....
Apr.	195.2	75.08	38.7	1.94	....	....	....	....
May	197.0	77.81	39.7	1.96	....	....	....	....
June	198.4	79.60	40.2	1.98	....	....	....	....
July	173.1	76.83	39.4	1.95	....	....	....	....
Aug.	177.0	76.25	39.1	1.95	....	....	....	....
Sept.	198.9	77.81	39.3	1.98	....	....	....	....
Oct.	204.2	81.20	40.4	2.01	....	....	....	....
Nov.	204.6	83.02	41.1	2.02	....	....	....	....
Dec.	209.3	85.07	41.7	2.04	....	....	....	....

Tires and Tubes

Jan.	86.4	82.88	37.5	2.21	87.8	97.41	41.4	2.37
Feb.	85.3	83.03	37.4	2.22	88.9	96.46	40.7	2.37
Mar.	84.7	80.89	36.6	2.21	....	....	....	....
Apr.	83.2	84.14	37.9	2.22	....	....	....	....
May	83.9	88.65	39.4	2.25	....	....	....	....
June	85.0	92.06	40.2	2.29	....	....	....	....
July	67.3	87.01	38.5	2.26	....	....	....	....
Aug.	68.0	85.65	37.4	2.29	....	....	....	....
Sept.	85.2	86.18	38.3	2.25	....	....	....	....
Oct.	86.5	90.39	39.3	2.30	....	....	....	....
Nov.	83.7	94.54	40.4	2.34	....	....	....	....
Dec.	87.0	98.18	41.6	2.36	....	....	....	....

Rubber Footwear

Jan	21.5	62.98	38.4	1.64	22.1	68.97	40.1	1.72
Feb.	20.5	65.57	39.5	1.66	21.6	69.72	40.3	1.73
Mar.	19.6	65.51	39.7	1.65	....	....	....	....
Apr.	19.2	63.58	38.3	1.66	....	....	....	....
May	19.8	65.46	39.2	1.67	....	....	....	....
June	19.8	67.30	40.3	1.67	....	....	....	....
July	20.1	68.45	40.5	1.69	....	....	....	....
Aug.	20.5	66.40	40.0	1.66	....	....	....	....
Sept.	21.0	66.08	39.1	1.69	....	....	....	....
Oct.	21.9	71.34	41.0	1.74	....	....	....	....
Nov.	22.3	71.51	41.1	1.74	....	....	....	....
Dec.	22.3	71.69	41.2	1.74	....	....	....	....

All Other Rubber Products

Jan.	97.8	70.62	39.9	1.77	101.1	76.08	41.8	1.82
Feb.	97.1	70.40	40.0	1.76	101.5	76.68	41.9	1.83
Mar.	95.1	70.22	39.9	1.76	....	....	....	....
Apr.	92.8	69.30	39.6	1.75	....	....	....	....
May	93.3	70.98	40.1	1.77	....	....	....	....
June	93.6	70.98	40.1	1.77	....	....	....	....
July	85.7	70.62	39.9	1.77	....	....	....	....
Aug.	88.5	71.15	40.2	1.77	....	....	....	....
Sept.	92.7	72.36	40.2	1.80	....	....	....	....
Oct.	95.8	74.98	41.2	1.82	....	....	....	....
Nov.	98.6	75.71	41.6	1.82	....	....	....	....
Dec.	100.0	76.44	42.0	1.82	....	....	....	....

Source: U. S. Department of Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1951 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	36.09	33.37	31.89	45.04	42.96	33.24	34.15	35.07
Feb.	33.63	33.41	32.79	(a)	41.64	33.76	35.00	35.04
Mar.	35.04	33.44	32.65	46.06	41.70	34.10	35.23	34.33
Apr.	38.10	33.84	33.23	46.06	41.79	33.85	35.22	34.23
May	38.57	33.73	33.64	46.06	39.98	34.30	35.34	34.80
June	38.12	33.56	34.61	46.06	41.31	34.11	35.17	34.83
July	34.89	32.99	38.11	46.21	40.37	34.20	35.37	....
Aug.	32.23	32.06	38.93	35.93	40.42	33.82	35.19	....
Sept.	31.92	30.94	41.62	36.20	39.75	33.69	35.46	....
Oct.	32.01	30.32	40.66	38.13	37.52	33.53	35.24	....
Nov.	32.15	30.52	43.11	42.70	35.59	33.60	34.80	....
Dec.	32.90	31.08	43.37	43.32	33.76	33.52	35.03	....
Average for Year	34.64	32.44	37.05	42.43	39.71	33.81	35.10	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1953	1954	1955		1953	1954	1955
Jan.	132	114	145	July	114	85	...
Feb.	140	114	144	Aug.	122	94	...
Mar.	143	118	146	Sept.	122	118	...
Apr.	140	116	...	Oct.	127	132	...
May	137	118	...	Nov.	120	124	...
June	131	121	...	Dec.	111	128	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	434	361	424	July	460	393	...
Feb.	442	360	440	Aug.	424	352	...
Mar.	452	378	466	Sept.	414	346	...
Apr.	443	382	...	Oct.	405	346	...
May	443	378	...	Nov.	360	404	...
June	442	385	...	Dec.	372	417	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	839	835	790	July	901	787	...
Feb.	839	848	782	Aug.	888	754	...
Mar.	854	844	805	Sept.	899	799	...
Apr.	857	813	...	Oct.	878	835	...
May	868	798	...	Nov.	865	811	...
June	893	817	...	Dec.	859	821	...

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1913	113	59	82.04	1934	15⅞	8¼	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26¾	14	19.39
1917	90	52	72.23	1938	17⅞	10⅛	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅜	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅛	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅞	19⅞	24.21
1933	9⅞	2⅞	5.96	1954	34½	19½	23.61

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	21.83	19.23	18.33	71.21	....	29.40	20.22	33.92
Feb.	20.42	18.49	19.40	73.61	....	27.57	19.98	34.90
Mar.	20.33	19.08	19.86	72.05	....	26.59	20.16	31.08
Apr.	22.87	18.53	23.51	....	....	24.66	22.06	31.75
May	23.39	17.92	28.07	....	....	25.52	21.96	31.35
June	22.80	16.36	30.92	....	....	24.42	23.01	34.74
July	24.24	16.45	39.10	....	30.52	23.64	24.12	....
Aug.	23.63	16.60	51.63	....	29.36	23.36	23.26	....
Sept.	22.81	17.58	55.98	....	27.42	23.06	23.99	....
Oct.	22.13	16.31	62.19	....	27.26	20.82	26.57	....
Nov.	20.52	16.70	73.05	....	29.25	20.58	28.07	....
Dec.	18.86	17.53	71.20	....	31.26	20.92	29.88	....
Average for Year	21.99	17.57	41.10	(a)	29.15	24.21	23.61	....

Note: (a) Free trading suspended March 31, 1951, and resumed on July 1, 1952.

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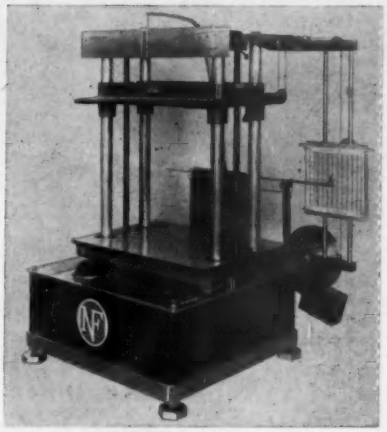

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car.	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	37,949	55,124	1,543	94,617	96,150	15,720
Passenger Car.	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car.	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1954:						
Aug. (total)	2,527	5,429	123	8,080	5,427	9,985
Passenger Car.	2,284	4,605	73	6,962	4,710	7,797
Truck and Bus	243	824	51	1,118	717	2,188
Sept. (total) ...	1,601	4,537	130	6,269	7,279	11,184
Passenger Car.	1,375	3,825	73	5,273	6,242	8,951
Truck and Bus	227	712	57	995	1,037	2,233
Oct. (total)	1,868	4,251	147	6,266	7,869	12,799
Passenger Car.	1,617	3,423	81	5,121	6,702	10,531
Truck and Bus	251	828	67	1,146	1,167	2,268
Nov. (total)	3,124	3,560	158	6,842	7,626	13,676
Passenger Car.	2,823	2,844	92	5,759	6,480	11,331
Truck and Bus	301	716	67	1,084	1,145	2,345
Dec. (total)	3,707	3,470	169	7,346	8,444	14,774
Passenger Car.	3,383	2,844	88	6,315	7,215	12,228
Truck and Bus	325	625	81	1,031	1,229	2,546
1955:						
Jan. (total)	3,785	4,967	159	8,911	9,040	14,949
Passenger Car.	3,481	4,139	79	7,699	7,797	12,363
Truck and Bus	303	827	81	1,211	1,243	2,586
Feb. (total)	3,833	4,281	157	8,272	8,745	15,368
Passenger Car.	3,540	3,551	83	7,174	7,549	12,687
Truck and Bus	294	730	74	1,098	1,196	2,681
Mar. (total)	4,780	4,926	201	9,907	10,083	15,609
Passenger Car.	4,326	4,254	104	8,685	8,810	12,875
Truck and Bus	454	672	96	1,222	1,273	2,734
Apr. (total)	4,457	5,315	165	9,937	9,153	14,890
Passenger Car.	3,967	4,677	89	8,733	8,000	12,197
Truck and Bus	489	639	76	1,204	1,153	2,692
May (total)	4,352	5,361	152	9,865	9,949	14,936
Passenger Car.	3,871	4,705	87	8,663	8,742	12,235
Truck and Bus	481	656	65	1,202	1,208	2,701

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,794	1,212,790	5,533,584
1943	0	4,501	4,501	1953	6,121,787	1,202,196	7,323,983
1944	0	124,819	124,819	1954	5,558,897	1,038,045	6,596,942
1954:							
Jan.	454,562	96,167	550,729	July	451,663	78,507	530,170
Feb.	446,676	87,141	533,817	Aug.	445,306	75,835	521,141
Mar.	531,529	101,177	632,706	Sept.	300,998	68,618	369,616
Apr.	534,667	96,723	631,390	Oct.	221,195	66,138	287,160
May	497,062	91,226	588,288	Nov.	498,248	89,232	587,480
June	507,055	91,470	598,525	Dec.	669,936	95,811	765,747
1955:							
Jan.	635,513	89,676	725,189	July	.....	.....	.....
Feb.	677,705	67,061	744,766	Aug.	.....	.....	.....
Mar.	791,280	102,992	894,272	Sept.	.....	.....	.....
Apr.	753,434	127,887	881,321	Oct.	.....	.....	.....
May	721,139	127,941	849,080	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	...
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953	37,957	36,072	878	74,907	74,425	11,874
1954	25,071	35,576	945	61,593	48,279	9,519
1954:						
Aug.	2,174	3,504	69	5,748	3,773	6,588
Sept.	1,130	2,839	64	4,034	4,490	7,179
Oct.	429	2,567	92	3,087	3,953	8,313
Nov.	450	2,142	90	2,681	3,246	8,706
Dec.	476	2,019	74	2,569	3,201	9,299
1955:						
Jan.	413	3,629	74	4,116	3,089	8,252
Feb.	352	2,430	80	2,862	2,850	8,244
Mar.	491	2,732	105	3,327	3,234	8,217
Apr.	530	2,635	85	3,250	2,836	7,963
May	531	2,617	84	3,233	3,005	7,735

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins							All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	63,691	62,385	129,215	52,353	22,152	22,823	27,790	22,411	77,478	480,299
1953										
July	4,638	2,821	8,580	3,376	1,507	1,798	2,500	1,859	6,402	33,481
Aug.	4,903	4,609	8,650	3,851	2,063	1,850	2,412	1,721	6,121	36,180
Sept.	5,318	4,855	9 485	4,281	2,073	1,948	2,284	2,000	5,824	38,066
Oct.	5,568	5,081	10,219	4,542	2,279	1,707	2,941	2,049	7,118	41,505
Nov.	4,507	4,126	9,443	3,615	1,447	1,561	2,446	1,755	6,711	35,610
Dec.	4,965	4,579	12,469	4,024	1,549	1,789	3,456	1,721	7,123	41,676
1954										
Jan.	4,869	5,435	10,120	4,638	911	1,614	1,731	1,825	5,988	37,131
Feb.	5,170	5,720	10,711	4,346	1,170	1,829	2,407	2,038	6,712	40,103
Mar.	7,348	6,790	12,255	4,826	1,432	2,029	2,392	2,622	6,127	45,819
Apr.	6,457	6,455	12,568	4,479	1,894	1,864	2,311	2,407	6,325	44,700
May	4,775	3,840	11,096	3,582	3,256	1,730	2,643	2,578	6,010	39,510
June	5,100	3,003	10,529	3,552	3,554	1,916	2,744	2,500	5,343	38,241
July	5,114	3,441	9,648	3,105	3,356	1,859	2,598	1,951	5,010	36,082
Aug.	7,078	4,522	14,541	4,259	3,931	2,198	3,407	2,444	5,804	48,183
Sept.	5,665	4,340	13,454	3,784	3,797	2,242	3,779	2,379	5,768	45,208
Oct.	....	....	....	....	....	....	....	....	....	....
Nov.	....	....	....	....	....	....	....	....	....	....
Dec.	....	....	....	....	....	....	....	....	....	....

Source: Chemical Division, U. S. Tariff Commission.

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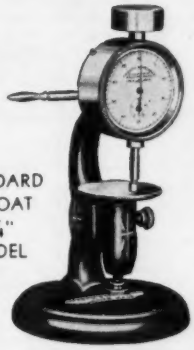

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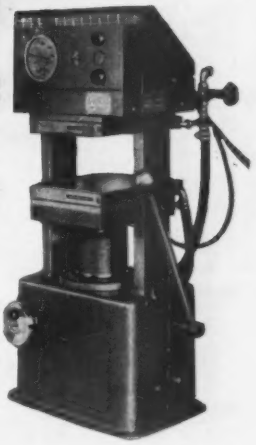

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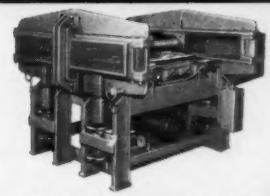

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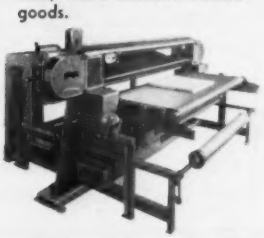

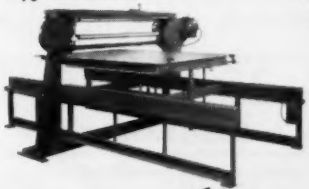

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Manufactured at: Plymouth Meeting, Penn., *Phone:* Plymouth Meeting 3-2880, *Mailing Address:* Box 671, Norristown, Penn.

Various Compounding Materials Consumed by the Rubber Industry

Material	1947	1948	1949	1950	1951	1952	1953
Antimony, Primary:							
Short tons	39	41	55	103[c]	19[c]	66	20
% of total	.002	.003	.005	.007	.001	.004	.001
Asphalt: [a]							
Short tons	32,113	19,967	18,050	26,819	21,414	33,288	.....
% of total	0.7	0.4	0.3	0.3	0.3	0.4	.....
Barite (Barytes):							
Short tons	17,000	18,000	14,000	19,000	15,000	14,000	.....
% of total	3.1	2.85	2.53	3.31	2.13	2.0	.....
Carbon Black:							
Short tons	471,790	435,282	383,565	515,184	530,614	537,273	566,797
% of total	94.3	95.5	93.3	92.9	93.9	93.1	94.4
Clay, Kaolin:							
Short tons	166,201	176,965	197,341	263,306	231,331	240,982	.....
% of total	11.5	11.3	13.1	15.0	12.7	13.2	.....
Clay, Fire & Stoneware:							
Short tons	17,970	15,480	27,148	9,500	.....	9,322	.....
% of total	0.2	0.2	0.3	0.1	.....	0.1	.....
Lime:							
Short tons	589	1,154	715	908	1,126	2,000	.....
% of total	0.01	0.02	.0002	.0002	[d]	[d]	.....
Litharge:							
Short tons	2,205	2,835	1,398	3,047	2,641	2,109	.....
% of total	1.3	1.8	1.2	1.7	1.7	1.5	.....
Lithopone:							
Short tons	3.085	4,192	3,245	4,092	3,295	1,523	1,723
% of total	1.9	3.0	4.1	3.9	3.2	2.5	3.3
Mica, Ground:							
Short tons	3,900	4,372	3,856	5,776	6,551	5,126	.....
% of total	6.0	7.0	7.0	8.0	9.0	7.0	.....
Sulfur:							
Short tons	72,800	70,560	59,360	75,000	75,000	75,000	.....
% of total	1.8	1.7	1.5	1.3	1.6	1.6	.....
Talc: [b]							
Short tons	71,840	66,226	53,400	75,900	70,970	64,476	.....
% of total	13.9	13.0	12.0	12.0	11.2	10.9	.....
Zinc Oxide:							
Short tons	82,248	82,895	58,496	82,944	71,507	72,774	78,439
% of total	51.2	54.9	52.5	51.6	48.4	51.2	52.7

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption—Tons	Consumption—% to Crude [a]	Exports	Stocks On Hand at End of Period
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	26.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1953	298,336	285,050	21.3	11,597	32,319
1954	258,101	249,049	20.2	10,232	30,746
1954:					
July	18,041	16,301	20.5	586	31,304
Aug.	15,519	17,660	22.0	647	27,692
Sept.	22,352	19,926	18.8	641	29,632
Oct.	23,566	22,098	19.3	808	30,395
Nov.	22,986	22,321	20.2	862	29,451
Dec.	25,790	24,546	20.5	816	30,746
1955:					
Jan.	25,336	25,322	20.2	1,041	29,656
Feb.	25,444	24,333	20.5	1,085	30,125
Mar.	29,574	28,674	21.1	1,088	30,311
Apr.	26,742	26,590	21.3	1,087	29,785
May	28,150	27,500	21.1	1,100	29,335

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton: Tire Cord Not Woven	Cotton: Cord Fabric Woven	Cotton: Chafer and All Other Tire Fabrics	Cotton: Total	Rayon and Nylon [b]: Tire Cord not Woven	Rayon and Nylon [b]: Tire Cord and Other Tire Fabrics	Rayon and Nylon [b]: Total
1952:							
Jan.-Mar.	11,226	36,378	12,971	60,575	14,434	72,249	86,683
Apr.-June	4,661	24,612	10,742	40,015	16,874	81,249	98,123
July-Sept.	335	9,257	9,460	19,052	18,128	80,355	98,483
Oct.-Dec.	*c*	4,728*a*	11,580	16,308	19,436	81,171	100,607
Total*	15,887	74,834	48,280	139,001	68,873	323,106	391,979
1953:							
Jan.-Mar.	*c*	4,378*a*	15,477	19,855	20,487	91,742	112,229
Apr.-June	*c*	5,713*a*	15,880	21,593	18,906	95,711	114,617
July-Sept.	*c*	3,562*a*	13,193	16,755	18,597	89,821	108,418
Oct.-Dec.	*c*	2,460	11,569	14,029	19,664	79,259	98,293
Total*	*c*	16,113	57,103	73,216	77,654	370,137	447,791
1954:							
Jan.-Mar.	*c*	2,585	13,229	15,814	17,297	78,388	95,685
Apr.-June	*c*	4,067	12,867	16,934	15,257	72,332	87,589
July-Sept.	*c*	2,104	9,321	11,425	12,851	56,890	69,741
Oct.-Dec.	*c*	3,743	12,476	16,219	14,609	86,269	100,878
Total	*c*	9,914	34,664	44,578	42,717	215,491	258,208

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord woven. (d) Included with chafer and all other tire fabrics. * Revised.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	61,308	63,125	66,981	80,670	86,863	89,634	89,852	96,397
Feb.	56,487	57,980	53,274	72,864	82,043	86,458	86,206	88,464
Mar.	68,171	73,282	78,780	86,962	87,065	98,158	101,549	105,684
Apr.	72,183	75,318	80,350	87,573	98,653	102,044	103,866	.....
May	77,186	81,665	89,035	100,266	101,137	105,918	104,418	.....
June	78,044	83,374	90,174	96,364	99,305	114,703	113,037	.....
July	81,428	83,129	91,677	100,567	105,307	112,960	112,231	.....
Aug.	80,351	84,707	94,507	101,453	102,954	109,124	110,223	.....
Sep.	76,159	80,832	86,725	91,891	100,095	106,158	104,706	.....
Oct.	75,164	79,327	89,067	100,209	103,689	106,037	105,607	.....
Nov.	72,560	76,346	82,688	88,581	91,326	99,210	102,393	.....
Dec.	72,162	75,628	81,032	84,551	95,817	100,225	104,258	.....
	871,270	913,713	994,290	1,091,951	1,154,254	1,230,629	1,238,346	.....

Source: U. S. Bureau of Mines.

Rim Production

	1950	1951	1952	1953	1954
Passenger Car	35,096,404	29,145,367	24,936,844	31,318,461	25,952,322
Truck & Bus	6,625,129	6,877,419	5,752,674	5,228,321	4,463,689
Agricultural	2,853,483	3,019,581	2,073,116	1,943,487	1,297,040
Earth Mover	15,602	28,026	31,791	24,685	21,536
Total	44,590,618	39,070,393	32,794,425	38,514,954	31,734,587

	1954 Dec.	1955 Jan.	Feb.	Mar.	Apr.	May
Passenger Car	3,187,971	3,341,979	3,060,249	3,919,117	3,829,339	3,503,467
Truck & Bus	426,620	456,169	415,433	558,758	628,480	695,090
Agricultural	118,336	162,480	155,018	225,915	184,851	201,091
Earth Mover	2,377	2,663	2,124	2,249	3,773	2,293
Total	3,735,304	3,963,291	3,632,824	4,706,039	4,646,443	4,401,941

Source: The Tire & Rim Association, Inc.

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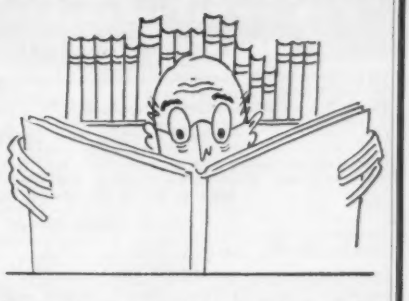

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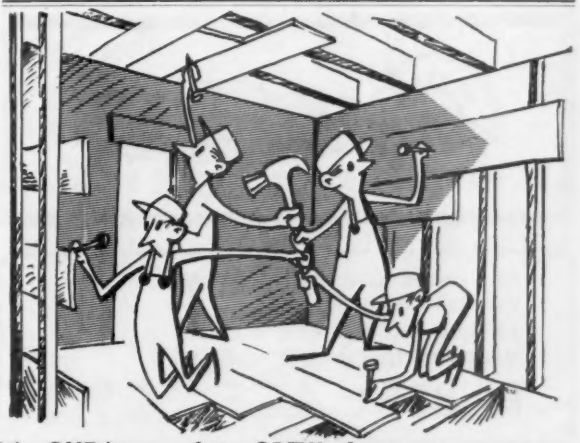

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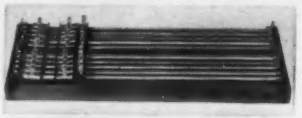

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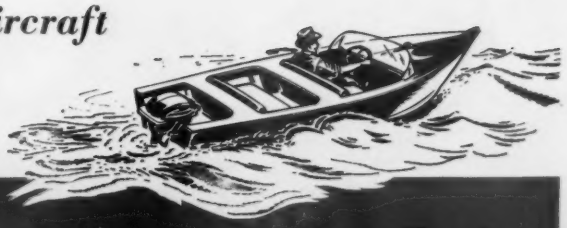

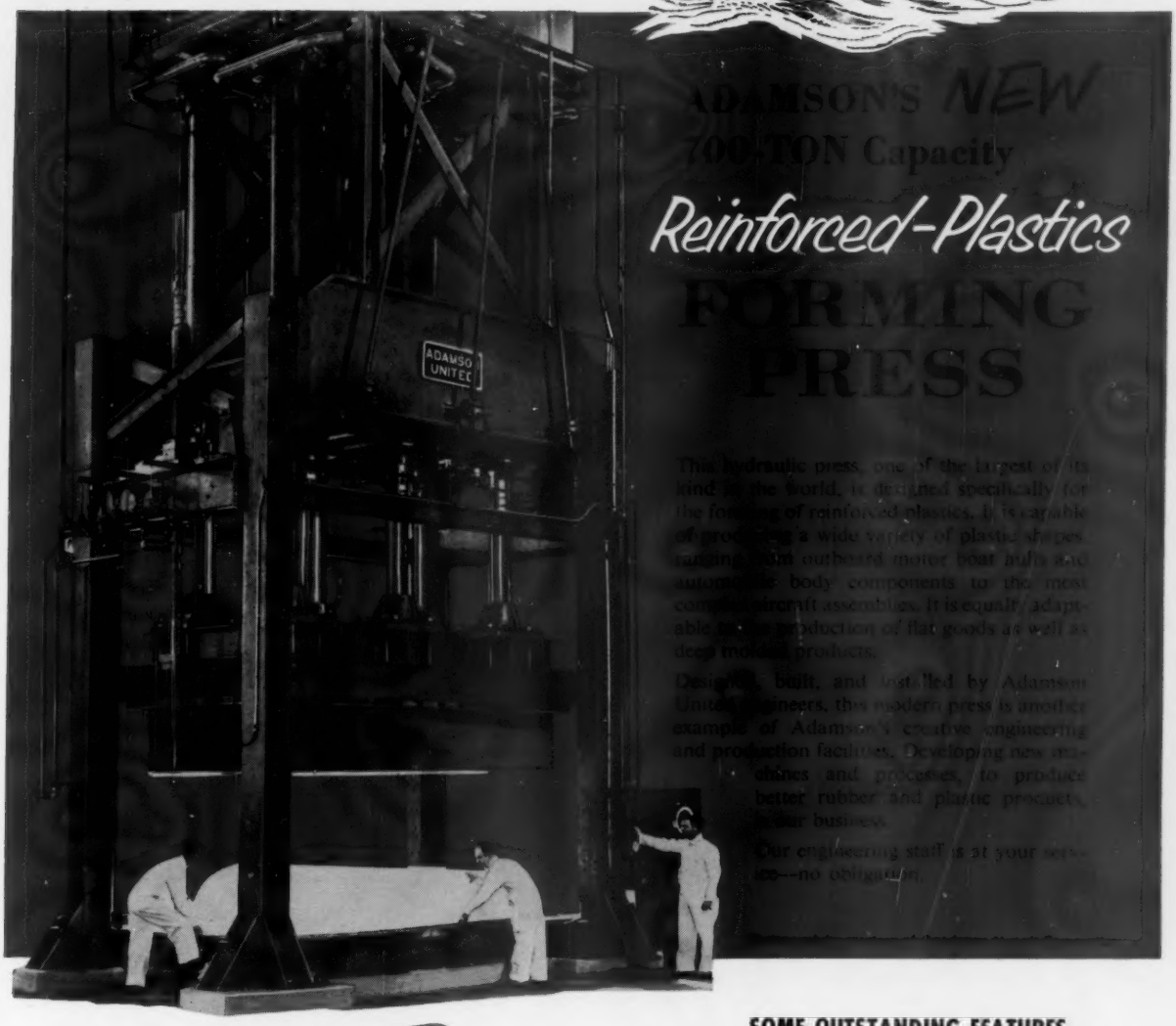

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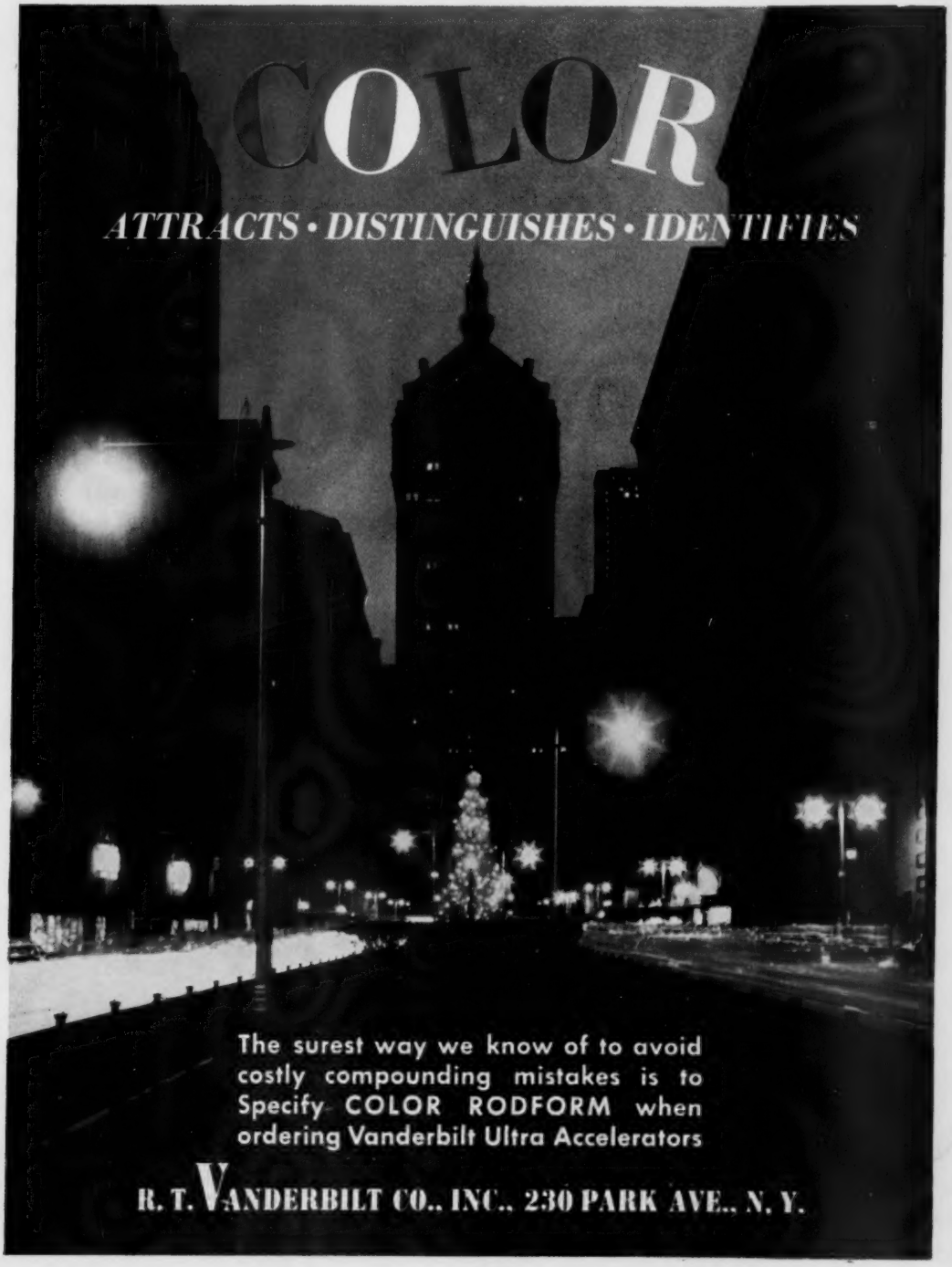
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